Modicon M171
Electronic Expansion Valve drivers

User Manual

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All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only the manufacturer should perform repairs to components.

When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

Failure to use Schneider Electric software or approved software with our hardware products may result in injury, harm, or improper operating results.

Failure to observe this information can result in injury or equipment damage.

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ABOUT THE BOOK

How to use this manual

This manual uses the following conventions to highlight certain parts of the text:

	Note	Indicates further information on the subject concerned that the user should take into account.
	Tip	A suggestion that could help the user to understand and make better use of the information provided
*, **, (*), (**), ([1]), ([2]), (§)		Provides further specifications on an explanation provided previously
Fig. 1, 1 - Fig. 1, etc.		Provides references to figures, details in figures, parts of the text. Figures are referred to using an abbreviation in bold (E.g. "**Fig.**") and a number identifying the reference (E.g. **Fig. 1**). For components inside figures, the references are given using a letter or number (E.g. **1 - Fig. 1**). References to parts of the text are given using the number and title of the relative chapters, sub-chapters, paragraphs and page number.

Document Scope

This document describes the **Modicon M171 Electronic Expansion Valve** drivers and accessories including installation and wiring information.

Validity Note

This document is valid for **SoMachine HVAC**.

Related Documents

Title of Documentation	Reference Document Code
Modicon M171 Performance logic controllers Hardware User Manual	EIO0000002030 (ENG)
Modicon M171 Optimized logic controllers Hardware User Manual	EIO0000002032 (ENG)
SoMachine HVAC software Quick Start	EIO0000002035 (ENG)
SoMachine HVAC software HelpOnLine Manual	EIO0000002036 (ENG)
TM171 EEV driver Instruction Sheet	EAV96021

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www.schneider-electric.com

SAFETY INFORMATION

Important Information

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, or maintain it. The following special messages may appear throughout this documentation or on the equipment to inform of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a Danger safety label indicates that an electrical hazard exists, which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards.
Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, **results in** death or serious injury**.**

⚠ WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, **can result in** death or serious injury.

⚠ CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, **can result in** minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury.

PLEASE NOTE

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel.
No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.
A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

Permitted use

This product is used to control stepper type unipolar and bipolar electronic expansion valves in HVAC applications.

For safety reasons, the device must be installed and used in accordance with the instructions provided. In particular, parts carrying dangerous voltages must not be accessible under normal conditions.

The device must be adequately protected from water and dust with regard to the application, and must only be accessible using tools (with the exception of the front panel).

The device is also suitable for use in household and commercial refrigeration appliances and/or similar equipment and has been tested for safety aspects in accordance with the harmonized European reference standards.

Prohibited use

Any use other than that expressed above under Permitted use is strictly prohibited.

The relay contacts supplied are of an electromechanical type and subject to wear. Functional safety protection devices, specified in international or local standards, must be installed externally to this device.

Liability and residual risks

Schneider Electric liability is limited to the proper and professional use of this product under the guidelines contained in the present and other supporting documents, and does not extend to damages caused by (but not limited to):

- Unspecified installation/use and, in particular, in contravention of the safety requirements of established legislation or specified in this document;
- Use on equipment which does not provide adequate protection against electrocution, water and dust in the actual installation conditions;
- Use on equipment in which dangerous components can be accessed without the use of specific tools;
- Installation/use on equipment which does not comply with established legislation and standards.

Disposal

The appliance (or the product) must be disposed of separately in compliance with the local standards in force on waste disposal.

Product Related Information

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Disconnect all power from all equipment including connected devices, prior to removing any covers or doors, or installing or removing any accessories, hardware, cables, or wires.
- Always use a properly rated voltage sensing device to confirm the power is removed.
- Replace and secure all covers, accessories, hardware, cables, and wires and confirm that a proper ground connection exists before applying power to the unit.
- Use only the specified voltage when operating this equipment and any associated products.

Failure to follow these instructions will result in death or serious injury.

This equipment has been designed to operate outside of any hazardous location.
Only install this equipment in zones known to be free of hazardous atmosphere.

⚠ DANGER

POTENTIAL FOR EXPLOSION

Install and use this equipment in non-hazardous locations only.

Failure to follow these instructions will result in death or serious injury.

⚠ WARNING

LOSS OF CONTROL

- The designer of any control scheme must consider the potential failure modes of control paths and, for certain critical control functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop and overtravel stop, power outage and restart.
- Separate or redundant control paths must be provided for critical control functions.
- System control paths may include communication links. Consideration must be given to the implications of unanticipated transmission delays or failures of the link.
- Observe all accident prevention regulations and local safety guidelines.(1)
- Each implementation of this equipment must be individually and thoroughly tested for proper operation before being placed into service.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

(1) For additional information, refer to NEMA ICS 1.1 (latest edition), “Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control” and to NEMA ICS 7.1 (latest edition), “Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems” or their equivalent governing your particular location.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- Only use software approved by Schneider Electric for use with this equipment.
- Update your application program every time you change the physical hardware configuration.

Failure to follow these instructions can result in death, serious injury, or equipment damage

1 - INTRODUCTION

1.1 - General description

TM171VEV•• is the compact solution of the Schneider Electric platform of drivers managing unipolar and bipolar step-by-step electronic expansion motor valves suited for a range of needs in the HVAC/R market and beyond.

The possibility to select refrigerant types and compatibility with most commercially available valves make the **TM171VEV••** particularly versatile.

TM171VEV•• also offers the possibility to configure a refrigerant that is not included in the factory default settings.

The current-controlled valve and independent hot-cold operation with double regulator mapping improves performance.

TM171VEV•• in fact ensures a very precise, stable and reliable control of the refrigerant flow, consequently increasing efficiency and energy savings by adjusting the overheating and valve opening according to the performance demanded by the system and in different working conditions.

The isolated serial connections and backup sensors help assure reliability.

TM171VEV•• is available in various references, which can be used as single actuators or in “stand-alone” mode (via Digital inputs or RS485 serial port). The references are available mounted on a DIN rail.

An **TM171DLED** terminal is used to configure the parameters and operations to carry out on the device, connected to the LAN serial port inside the door.

TM171VEV•• also has the same Modbus RTU serial communication standard interface and the option of downloading parameter maps and applications via the M171 Opt. Programming stick (**TM171AMFK**).

Ratiometric pressure sensors and **TM171DLED** terminals can also be connected with no need for any further serial interfaces.

All digital inputs and digital outputs are independent and configurable, meaning they can be adapted to fit any system.

Power supply 24V~/24V⎓.

1.2 - Main functions

The main functions of the **TM171VEV••** are as follows:

- refrigerant selected via selectors (DIP switches) under the door;
- backup probes control saturation and evaporator output (overheating);
- valve state shown via leds;
- parameter settings via keyboard or PC;
- **TM171AMFK** to download or upload parameter maps and applications;
- terminal (up to 100m) that can be connected directly with no serial interface;
- configurable inputs NTC, Pt1000, 4...20mA, 0...10V, 0...5V ratiometric;
- 2 Digital inputs to control valve and/or alarms.

2 - REFERENCES AND ACCESSORIES

2.1 - References

Reference	Non-dangerous voltage Analog Inputs	Digital voltage free inputs	Digital Outputs with dangerous voltage	Open Collector digital output:	integrated RS485 serial	Power supply
TM171VEVM2	4	2	1	1	YES	24V~/⎓ Imax 0.8A/ph
TM171VEVD2	4	2	1	1	NO	24V~/⎓ Imax 0.8A/ph
TM171VEVA1	1	0	1	0	NO	24V~/⎓ Imax 0.8A/ph

Tab. 1 References

2.2 - Terminal

Reference	Mounting	Dimensions	Display	Power supply
TM171DLED	Panel	74x32x30 mm	LED / 4 digit	From **TM171VEV••** driver

Tab. 2 Terminal

TM171DLED terminal non included in the product box. To be ordered separately.

2.3 - Accessories

	Code	Description
	TM171DLED	M171 Opt. Display LED. 32x74 terminal.
	TM171AMFK	M171 Opt. Programming stick
	TM1STNTCSF44015T7	NTC 1,5m FAST IP67 4x40 -50+110°C Grey
	TM1STNTCTN62015T8	NTC 1,5m IP68 6x20 TPE w/ strap Grey
	TM171ADMI	M171 Opt. Programmable cable

Tab. 3 Accessories

GENERAL NOTES:

- Connection of remote keyboard via 3-way cables with no optional modules.

2.4 - List of compatible valves

The **TM171VEV••** driver is compatible with the valves listed below; for use with other valves, contact the Schneider Electric Technical Support.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

Verify the manufacturer valve parameter information before using your valve with the generic valve type.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Schneider Electric is not liable for the data provided by the valve manufacturer, including any technical modifications or updates.

Always consult the technical manual of the valve manufacturer, particularly to check the plate data and correct operations.

Reference	Power supply	Notes
SXVB manufactured by CASTEL	24V	Bipolar
ALCO EX5	24V	Bipolar
ALCO EX6	24V	Bipolar
ALCO EX7	24V	Bipolar
ALCO EX8	24V	Bipolar
DANFOSS ETS50	12V	Bipolar
DANFOSS ETS100	12V	Bipolar
CAREL E2V-E3V-E4V-E5V-E6V-E7V	12V	Bipolar
SPORLAN SER(I) G, J, K, B, C, D	12V	Bipolar
SPORLAN SER 1.5 TO 20	12V	Bipolar
SPORLAN SEI-30	12V	Bipolar
SPORLAN SEI-50	12V	Bipolar
SPORLAN SEH	12V	Bipolar reference only
SANHUA DPF(Q)-DPF(T01)	12V	Unipolar
ALCO EXM246-EXL246	12V	Unipolar

Tab. 4 Compatible valves

3 - MECHANICAL INSTALLATION

3.1 - Before Starting

Read and understand this chapter before beginning the installation of your system. The use and application of the information contained herein require expertise in the design and programming of automated control systems. Only you, the user, machine builder or integrator, can be aware of all the conditions and factors present during installation and setup, operation, and maintenance of the machine or process, and can therefore determine the automation and associated equipment and the related safeties and interlocks which can be effectively and properly used. When selecting automation and control equipment, and any other related equipment or software, for a particular application, you must also consider any applicable local, regional or national standards and/or regulations. Pay particular attention in conforming to any safety information, different electrical requirements, and normative standards that would apply to your machine or process in the use of this equipment.

The use and application of the information contained herein require expertise in the design and programming of automated control systems. Only you, the user, machine builder or system integrator can be aware of all the conditions and factors present during installation and setup, operation, and maintenance of the machine or process, and can therefore determine the automation and associated equipment and the related safeties and interlocks which can be effectively and properly used. When selecting automation and control equipment, and any other related equipment or software, for a particular application, the user or integrator must also consider any applicable local, regional or national standards and/or regulations.

⚠ WARNING

REGULATORY INCOMPATIBILITY

Be sure that all equipment applied and systems designed comply with all applicable local, regional and national regulations and standards.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

3.2 - Disconnecting Power

All options and modules should be assembled and installed before installing the control system on a mounting rail, into a panel door or onto a mounting surface. Remove the control system from its mounting rail, mounting plate or panel before disassembling the equipment

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Disconnect all power from all equipment including connected devices, prior to removing any covers or doors, or installing or removing any accessories, hardware, cables, or wires.
- Always use a properly rated voltage sensing device to confirm the power is removed.
- Replace and secure all covers, accessories, hardware, cables, and wires and confirm that a proper ground connection exists before applying power to the unit.
- Use only the specified voltage when operating this equipment and any associated products.

Failure to follow these instructions will result in death or serious injury.

3.3 - Operating Environment

This equipment has been designed to operate outside of any hazardous location. Only install this equipment in zones known to be free of a hazardous atmosphere

⚠ DANGER

POTENTIAL FOR EXPLOSION

Install and use this equipment in non-hazardous locations only.

Failure to follow these instructions will result in death or serious injury.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

Install and operate this equipment according to the conditions described in this General Specifications.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

3.4 - Installation Considerations

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- Use appropriate safety interlocks where personnel and/or equipment hazards exist.
- Install and operate this equipment in an enclosure, or other locations that are appropriate for its rated environment.
- Power line and output circuits must be wired and fused in compliance with local and national regulatory requirements for the rated current and voltage of the particular equipment.
- Do not use this equipment in safety-critical machine functions.
- Do not disassemble, repair, or modify this equipment.
- Do not connect any wiring to reserved, unused connections, or to connections designated as Not Connected (N.C.).
- Do not mount devices in extremely damp and/or dirt-laden areas

Failure to follow these instructions can result in death, serious injury, or equipment damage.

NOTE: JDYX2 or JDYX8 fuse types are UL-recognized and CSA approved.

For mechanical dimensions, see **“3.8 - Mechanical dimensions” on page 18**.

The **Modicon M171** Electronic Expansion Valves devices are intended for DIN rail mounting.

Care must be taken to avoid damage from electrostatic sources when handling this equipment. In particular exposed connectors and, in some cases, exposed printed circuit boards are exceptionally vulnerable to electrostatic discharge.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION DUE TO ELECTROSTATIC DISCHARGE DAMAGE

- Keep equipment in the protective conductive packaging until you are ready to install the equipment.
- Only install equipment in approved enclosures and / or locations that prevent casual access and provide electrostatic discharge protection as defined by IEC 1000-4-2.
- Use a conductive wrist strap or equivalent field force protective device attached to an earth ground when handling sensitive equipment.
- Always discharge yourself by touching a grounded surface or approved antistatic mat before handling the equipment.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

3.5 - Installation of Generic valve type

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

Verify the manufacturer valve parameter information before using your valve with the generic valve type.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

3.6 - TM171VEV•• installation

The admissible ambient temperature range for correct operation is between –5 and 55 °C, 90% R.H. (non condensing).

Do not mount the device in extremely damp or dirt-laden areas; it is designed for use in places with ordinary or normal levels of pollution. Keep the area around the device cooling slots adequately ventilated.

The TTL serial is located on the upper part of the front cover and is inserted vertically.

The instrument is intended for DIN rail mounting.

Referring to **Fig. 1**, for installation on the DIN rail proceed as follows,

1. move the two “spring docking devices” to their standby position (use a screwdriver to press against the relative compartments);
2. install the device on the DIN rail, pressing on the “spring docking devices” with your fingers to put them into the locked position.

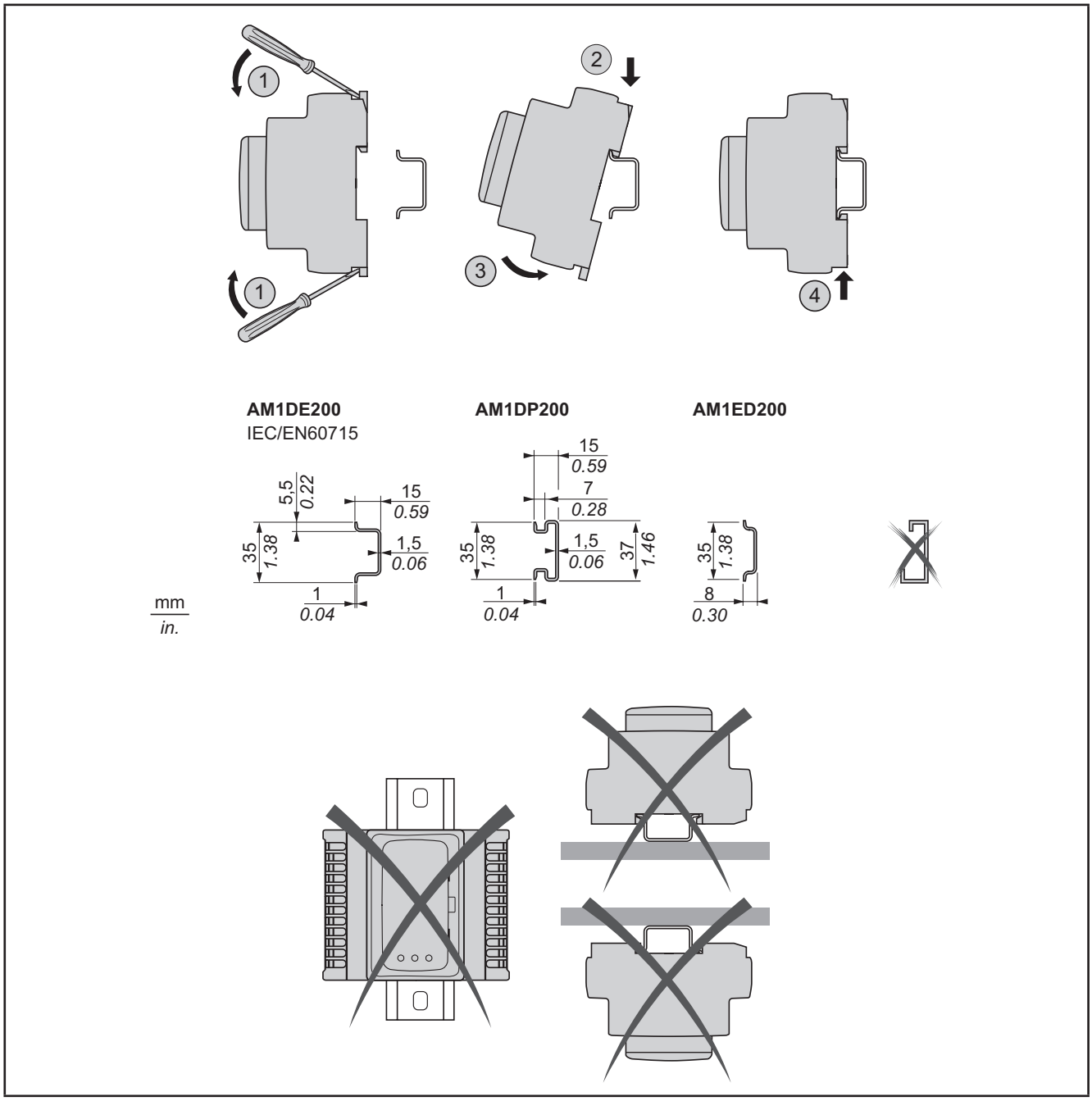


Fig. 1 Mounting

The **M171 Electronic Expansion Valve** drivers has been designed as an IP20 product and must be installed in an enclosure. Clearances must be respected when installing the product.
There are 3 types of clearances between:

- The **M171 Electronic Expansion Valve** drivers and all sides of the cabinet (including the panel door).
- The **M171 Electronic Expansion Valve** drivers terminal blocks and the wiring ducts.
  This distance reduces electromagnetic interference between the controller and the wiring ducts.
- The **M171 Electronic Expansion Valve** drivers and other heat generating devices installed in the same cabinet.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- Place devices dissipating the most heat at the top of the cabinet and ensure adequate ventilation.
- Avoid placing this equipment next to or above devices that might cause overheating.
- Install the equipment in a location providing the minimum clearances from all adjacent structures and equipment as directed in this document.
- Install all equipment in accordance with the specifications in the related documentation.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

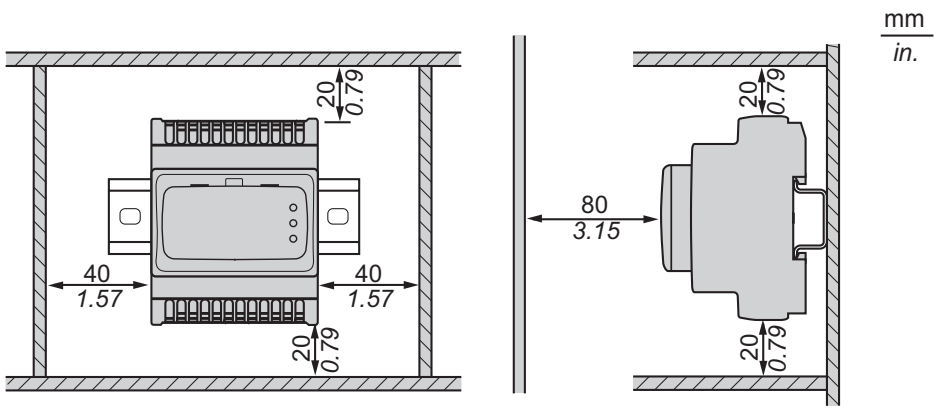


Fig. 2 Clearances

3.6.1 - Access to DIP switches/TM171DLED

Care must be taken to avoid damage from electrostatic sources when handling this equipment. In particular exposed connectors and, in some cases, exposed printed circuit boards are exceptionally vulnerable to electrostatic discharge.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION DUE TO ELECTROSTATIC DISCHARGE DAMAGE

- Keep equipment in the protective conductive packaging until you are ready to install the equipment.
- Only install equipment in approved enclosures and / or locations that prevent casual access and provide electrostatic discharge protection as defined by IEC 1000-4-2.
- Use a conductive wrist strap or equivalent field force protective device attached to an earth ground when handling sensitive equipment.
- Always discharge yourself by touching a grounded surface or approved antistatic mat before handling the equipment.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Referring to **Fig. 3**, for access to the DIP switches proceed as follows:

1. if necessary, use a straight-edge screwdriver or the nail of your index finger to open the door;
2. carefully configure the selectors (DIP switches) or connect **TM171DLED**;
3. if necessary, close the front of the keyboard by pressing with your fingers.

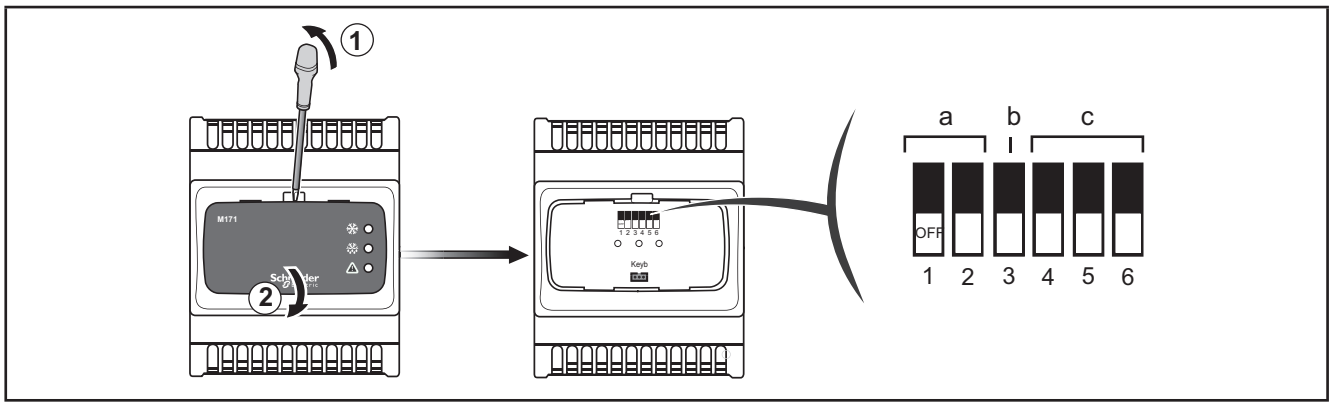


Fig. 3 Access to DIP switches/**TM171DLED**

3.7 - TM171DLED terminal mounting

The **TM171DLED** terminal is designed for panel mounting **(Fig. 4)**.

Do not install the device in places subject to high humidity and/or dirt; it is intended for use in sites with ordinary or normal levels of pollution. Keep the area around the device cooling slots adequately ventilated.

To mount the **TM171DLED** terminal proceed as follows:

1. make a 71x29 mm hole;
2. insert the instrument;
3. fix the **TM171DLED** using the brackets supplied.

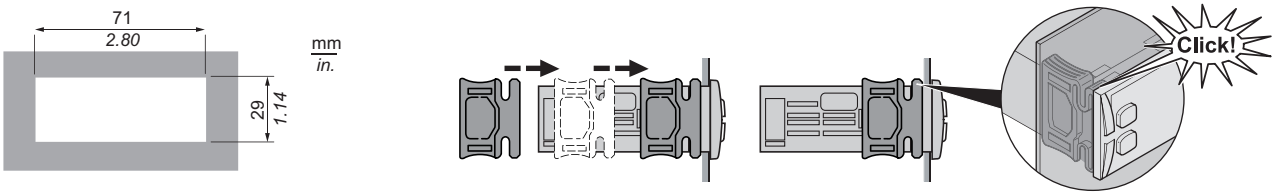


Fig. 4 **TM171DLED** mounting

3.8 - Mechanical dimensions

	Length (L) mm	Depth (d) mm	Height (H) mm	Notes
TM171DLED front cover	76.4	-	35	(+0.2 mm)
TM171VEV•• front panel (box)	70	-	45	(+0.2 mm)
TM171DLED measurements	86	30	26	-
TM171VEV•• measurements	70.2	61.6 56.4 from Din bar to cover	87	4DIN
TM171DLED Hole for panel-mounting	71	-	29	(+0.2 mm/-0.1mm)

Tab. 5 Mechanical dimensions

4 - ELECTRICAL CONNECTIONS

4.1 - Wiring Best Practices

The following information describes the wiring guidelines and associated best practices to be respected when using the **M171 Electronic Expansion Valve** drivers.

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Disconnect all power from all equipment including connected devices, prior to removing any covers or doors, or installing or removing any accessories, hardware, cables, or wires.
- Always use a properly rated voltage sensing device to confirm the power is removed.
- Replace and secure all covers, accessories, hardware, cables, and wires and confirm that a proper ground connection exists before applying power to the unit.
- Use only the specified voltage when operating this equipment and any associated products.

Failure to follow these instructions will result in death or serious injury.

⚠ WARNING

LOSS OF CONTROL

- The designer of any control scheme must consider the potential failure modes of control paths and, for certain critical control functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop and overtravel stop, power outage and restart.
- Separate or redundant control paths must be provided for critical control functions.
- System control paths may include communication links. Consideration must be given to the implications of unanticipated transmission delays or failures of the link.
- Observe all accident prevention regulations and local safety guidelines.(1)
- Each implementation of this equipment must be individually and thoroughly tested for proper operation before being placed into service.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

(1) For additional information, refer to NEMA ICS 1.1 (latest edition), “Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control” and to NEMA ICS 7.1 (latest edition), “Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems” or their equivalent governing your particular location.

4.1.1 - Wiring Guidelines

The following rules must be applied when wiring a **M171 Electronic Expansion Valve** drivers:

- I/O and communication wiring must be kept separate from the power wiring. Route these two types of wiring in separate cable ducting.
- Verify that the operating conditions and environment are within the specification values.
- Use proper wire sizes to meet voltage and current requirements.
- Use copper conductors (required).
- Use twisted pair, shielded cables for analog, and/or fast I/O.
- Use twisted pair, shielded cables for networks, and fieldbus.

Use shielded, properly grounded cables for all analog and high-speed inputs or outputs and communication connections. If you do not use shielded cable for these connections, electromagnetic interference can cause signal degradation. Degraded signals can cause the controller or attached modules and equipment to perform in an unintended manner.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- Use shielded cables for all fast I/O, analog I/O and communication signals.
- Ground cable shields for all analog I/O, fast I/O and communication signals at a single point (1).
- Route communication and I/O cables separately from power cables.
- Make connections as short as possible and do not wind them around electrically connected parts.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

(1) Multipoint grounding is permissible if connections are made to an equipotential ground plane dimensioned to help avoid cable shield damage in the event of power system short-circuit currents.

NOTE: Surface temperatures may exceed 60 °C. Route primary wiring (wires connected to power mains) separately and apart from secondary wiring (extra low voltage wiring coming from intervening power sources). If that is not possible, double insulation is required such as conduit or cable gains.

4.1.2 - Rules for Removable Screw Terminal Block

The following table presents the cable types and wire sizes for a **5.08** or **5.00 pitch** removable screw terminal block:

mm / *in.* **7 / 0.28**								
mm^2	0.2…2.5	0.2…2.5	0.25…2.5	0.25…2.5	2 x 0.2…1	2 x 0.2…1.5	2 x 0.25…1	2 x 0.5...1.5
AWG	*24…14*	*24…14*	*22...14*	*22...14*	*2 x 24…18*	*2 x 24…16*	*2 x 22…18*	*2 x 20...16*

Ø 3,5 mm (*0.14 in.*)	C	N•m	0.5...0.6
		lb-in	*4.42...5.31*

Fig. 5 Pitch 5.08 mm (0.20 in.) or 5.00 mm (0.197 in.)

The use of copper conductors is required.

⚠ ⚠ DANGER

LOOSE WIRING CAUSES ELECTRIC SHOCK

- Tighten connections in conformance with the torque specifications.
- Do not insert more than one wire per connector of the terminal block without the cable ends specified in the tables found in the Rules for Removable Screw Terminal Block information.

Failure to follow these instructions will result in death or serious injury.

⚠ DANGER

FIRE HAZARD

- Use only the recommended wire sizes for the current capacity of the I/O channels and power supplies.
- For relay output wiring of 5 A, use conductors of at least 2.0 mm^2 (AWG 12) with a temperature rating of at least 80 °C (176 °F).

Failure to follow these instructions will result in death or serious injury.

4.1.3 - Protecting Outputs from Inductive Load Damage

Depending on the load, a protection circuit may be needed for the outputs on the controllers and certain modules. Inductive loads using DC voltages may create voltage reflections resulting in overshoot that will damage or shorten the life of output devices.

⚠ CAUTION

OUTPUT CIRCUIT DAMAGE DUE TO INDUCTIVE LOADS

Use an appropriate external protective circuit or device to reduce the risk od inductive direct current load damage.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

If your controller or module contains relay outputs, these types of outputs can support up to 240 Vac. Inductive damage to these types of outputs can result in welded contacts and loss of control. Each inductive load must include a protection device such as a peak limiter, RC circuit or flyback diode. Capacitive loads are not supported by these relays.

⚠ WARNING

RELAY OUTPUTS WELDED CLOSED

- Always protect relay outputs from inductive alternating current load damage using an appropriate external protective circuit or device.
- Do not connect relay outputs to capacitive loads.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Protective circuit A: this protection circuit can be used for both AC and DC load power circuits.

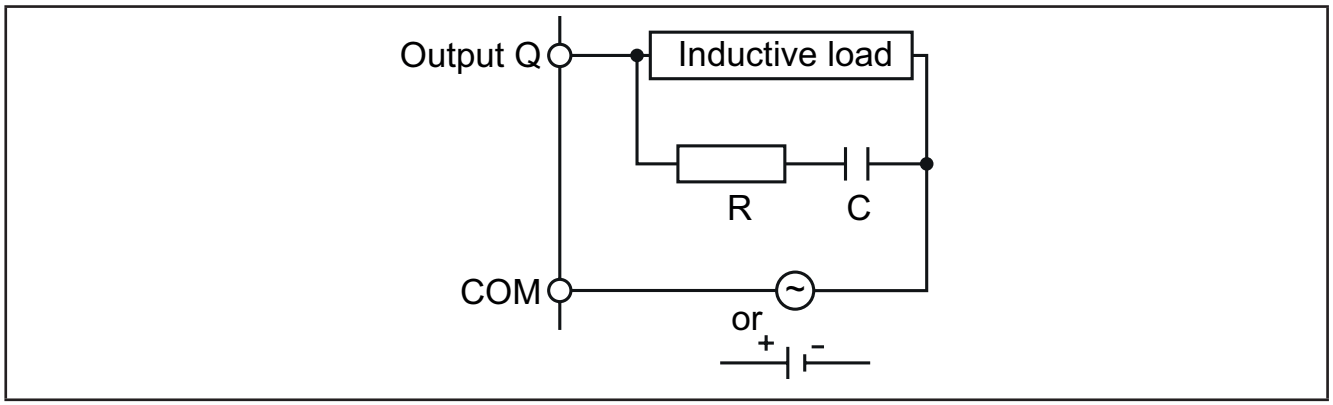


Fig. 6 Protective circuit A

C Value from 0.1 to 1 µF

R Resistor of approximately the same resistance value as the load

Protective circuit B: this protection circuit can be used for DC load power circuits.

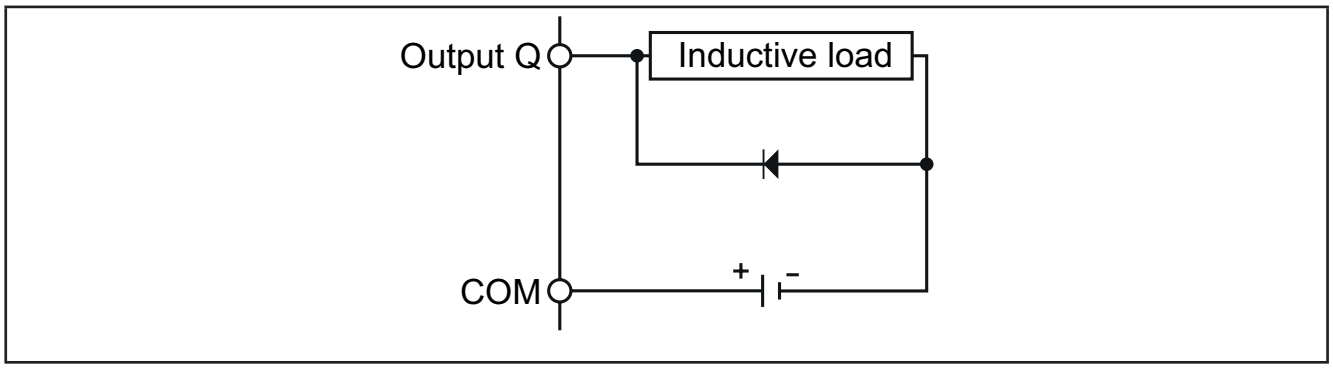


Fig. 7 Protective circuit B

Use a diode with the following ratings:

- Reverse withstand voltage: power voltage of the load circuit x 10.
- Forward current: more than the load current.

Protective circuit C: this protection circuit can be used for both AC and DC load power circuits.

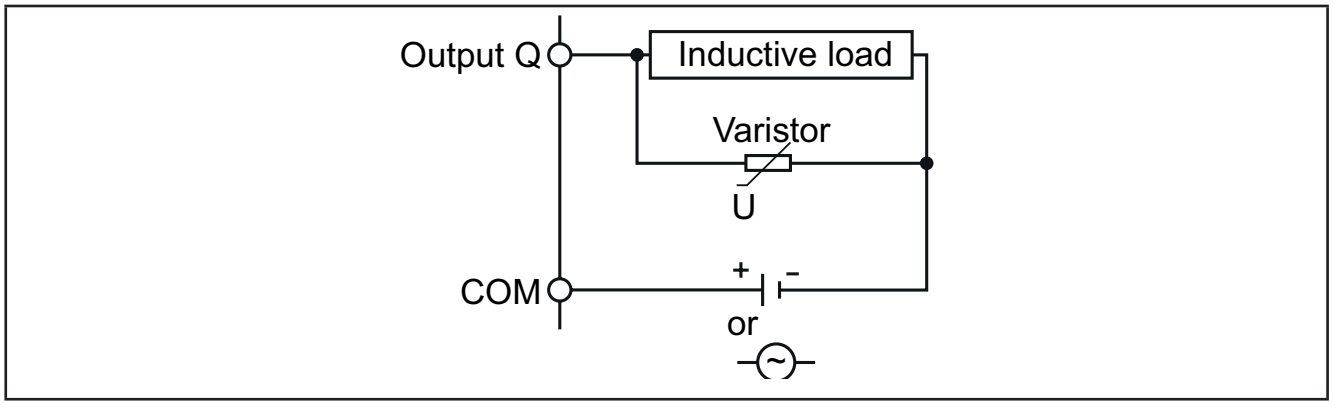


Fig. 8 Protective circuit C

In applications where the inductive load is switched on and off frequently and/or rapidly, ensure that the continuous energy rating (J) of the varistor exceeds the peak load energy by 20 % or more.

NOTE: Place protection devices as close to the load as possible.

4.1.4 - Special handling considerations

Care must be taken to avoid damage from electrostatic sources when handling this equipment. In particular exposed connectors and, in some cases, exposed printed circuit boards are exceptionally vulnerable to electrostatic discharge.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION DUE TO ELECTROSTATIC DISCHARGE DAMAGE

- Keep equipment in the protective conductive packaging until you are ready to install the equipment.
- Only install equipment in approved enclosures and / or locations that prevent casual access and provide electrostatic discharge protection as defined by IEC 1000-4-2.
- Use a conductive wrist strap or equivalent field force protective device attached to an earth ground when handling sensitive equipment.
- Always discharge yourself by touching a grounded surface or approved antistatic mat before handling the equipment.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Before doing anything, make sure the device is connected to a suitable external power supply.
See **“5.4 - Power Supply” on page 34**.

Before connecting the valve, carefully configure the TM171VEV•• driver by selecting the valve type from the list of compatible valves.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

Verify the manufacturer valve parameter information before using your valve with the generic valve type.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Always remove power from the equipment before performing any maintenance on their electrical connections.
To help ensure proper connections, comply with the following:

- Power supplies other than those specified can seriously damage the system.
- Use cables of suitable section for the terminals used.
- Separate the cables of probes and digital inputs from inductive loads and high voltage connections to prevent any electromagnetic interference. Do not place the probe cables near other electrical equipment (switches, meters, etc.).
- Make connections as short as possible and do not wind them around electrically connected parts.
- To avoid causing static discharges, do not touch the electronic components on the boards.
- The device must be connected to a suitable power supply that complies with the specifications provided in the Specifications chapter.

4.1.5 - Analog Inputs-probes

Temperature probes have no connection polarity and can be extended using a normal bipolar cable (note that the extension of the probes influences the electromagnetic compatibility (EMC) of the instrument: take great care with the wiring).

NOTE: Probes which have a specific connection polarity, which must be observed.

NOTICE
INOPERABLE EQUIPMENT Verify all wiring connections before applying power. **Failure to follow these instructions can result in equipment damage.**

NOTE: Apply power to all externally powered devices after applying power to the **M171 Electronic Expansion Valve** drivers.

NOTE: Signal leads (probes, digital inputs, communication and the electronic supply) must be routed separately from power cables.

4.1.6 - Serial connections

Pay special attention when connecting serial lines. Miswiring may lead to malfunctioning or inoperable equipment.

Label	Description
TTL	Use a 5-wire TTL cable up to 30 cm in length. An Schneider Electric-supplied TTL cable is recommended. Contact Schneider Electric sales department for item availability.
MFK	TTL serial present on the upper part of the device for connection to **TM171AMFK**
Keyb	3-wire voltage LAN serial inside the door for connection to the **TM171DLED** terminal. Max. distance 100 m

Tab. 6 Serial connections

NOTE: The **Keyb** connection must be used to configure the device and to view the resources.

NOTE: It is recommended to use this connection to work temporarily on the driver

4.2 - Wiring diagrams

Miswiring irreversibly damages the Modicon **M171 Electronic Expansion Valve** drivers.

NOTICE
INOPERABLE EQUIPMENT Verify all wiring connections before applying power. **Failure to follow these instructions can result in equipment damage.**

4.2.1 - TM171VEV•• wiring diagrams

Terminal	Label	Description	Notes	Parameters
2-3*	Open collector	Solenoid valve/Alarm	2=dO; 3= 12V⎓ Max. LOAD 100mA	dL91
3	12V⎓	Probe power supply	Power supply for probes with current inputs 4..20mA and O.C.	-
4-5-6-7	Valve Output	Valve output	4= W2; 5=W2; 6=W1; 7=W1	-
8-9	Supply	Power supply	Power supply V⎓ 8=+; 9=- Respect the polarity	-
10		Earth**		-
11-12	DO1	Relay output	Solenoid valve · Alarm	dL90
14-15-16	485	Televis/Modbus Serial Direct connection	Reference TM171VEVM4 only	-
17*	DI1	Digital input 1	Connecting the digital inputs to a power supply output is strictly forbidden	dL40
18*	DI2	Digital input 2		dL41
19	GND	Ground		-
20	5V⎓	Probe power supply	For ratiometric probe	-
21	AI1	Analog input 1	Saturation probe	dL10 / dL11 / dL20
22*	AI2	Analog input 2	Backup saturation probe	dL12 / dL13 / dL21
23*	AI3	Analog input 3	Evaporator output probe (overheating)	dL22
24*	AI4	Analog input 4	Evaporator output probe (overheating) backup	dL23

Tab. 7 Wiring diagrams

* Not present on **TM171VEVA1**.

** Earth connector where possible.

TM171VEVM4

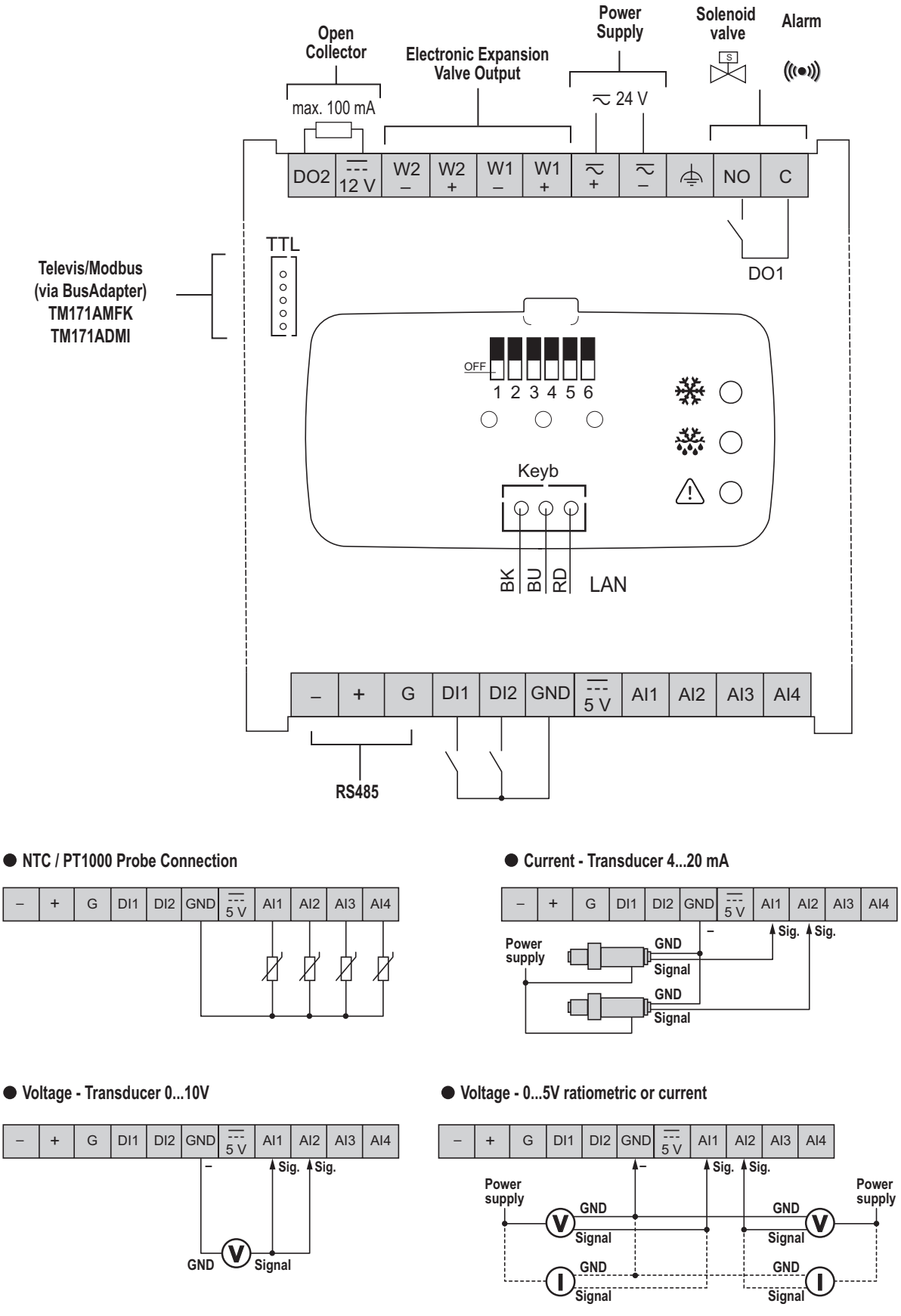
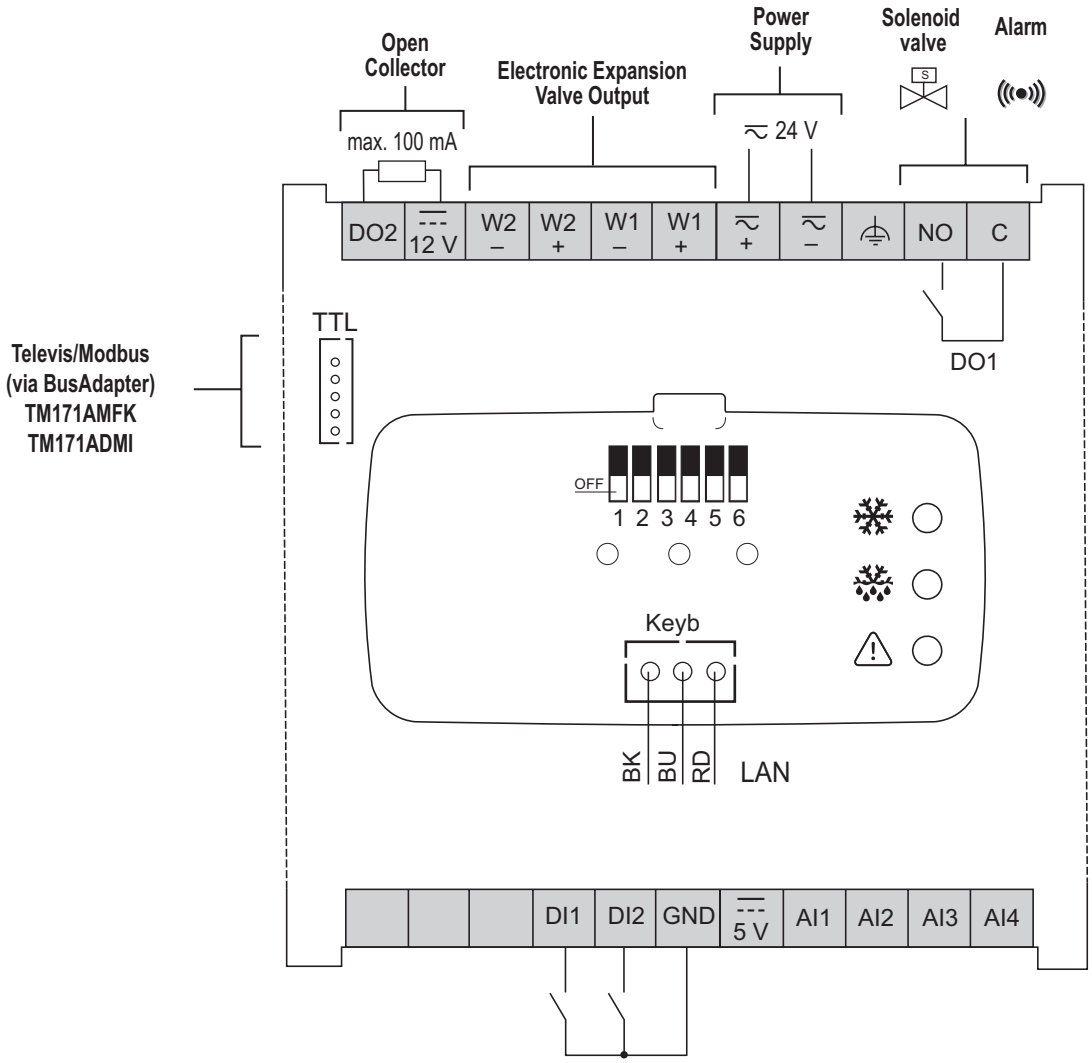
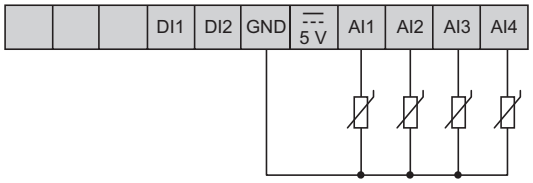


Fig. 9 **TM171VEVM4** reference wiring diagram

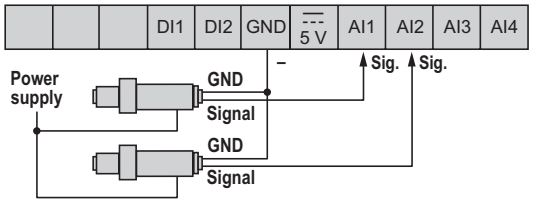
TM171VEVD4



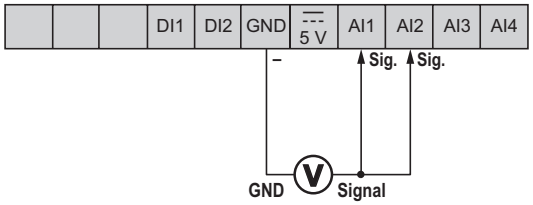
● NTC / PT1000 Probe Connection



● Current - Transducer 4...20 mA



● Voltage - Transducer 0...10V



● Voltage - 0...5V ratiometric or current

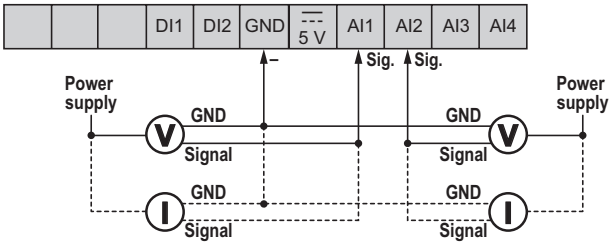
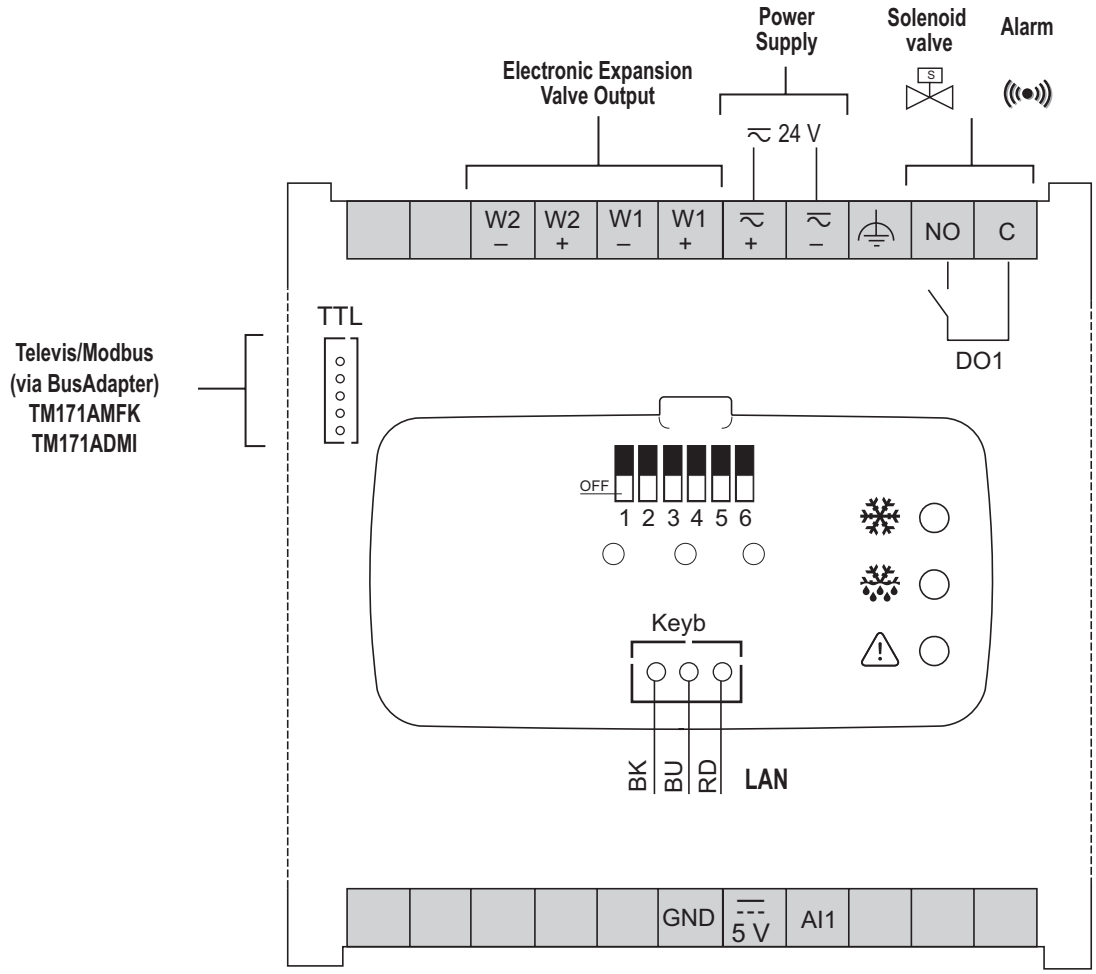
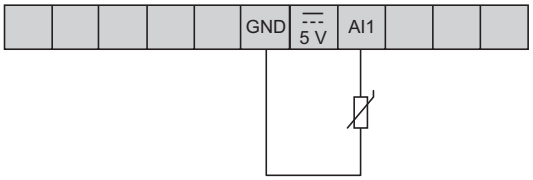


Fig. 10 TM171VEVD4 reference wiring diagram

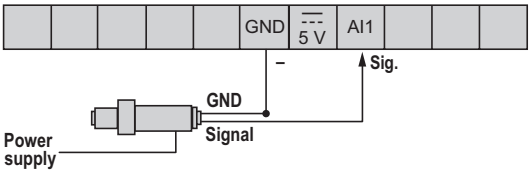
TM171VEVA2



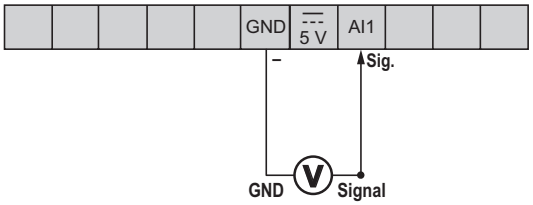
● NTC / PT1000 Probe Connection



● Current - Transducer 4...20 mA



● Voltage - Transducer 0...10V



● Voltage - 0...5V ratiometric or current

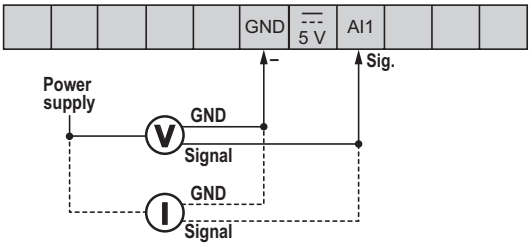


Fig. 11 TM171VEVA2 reference wiring diagram

4.3 - TM171VEV•• - TM171DLED connection

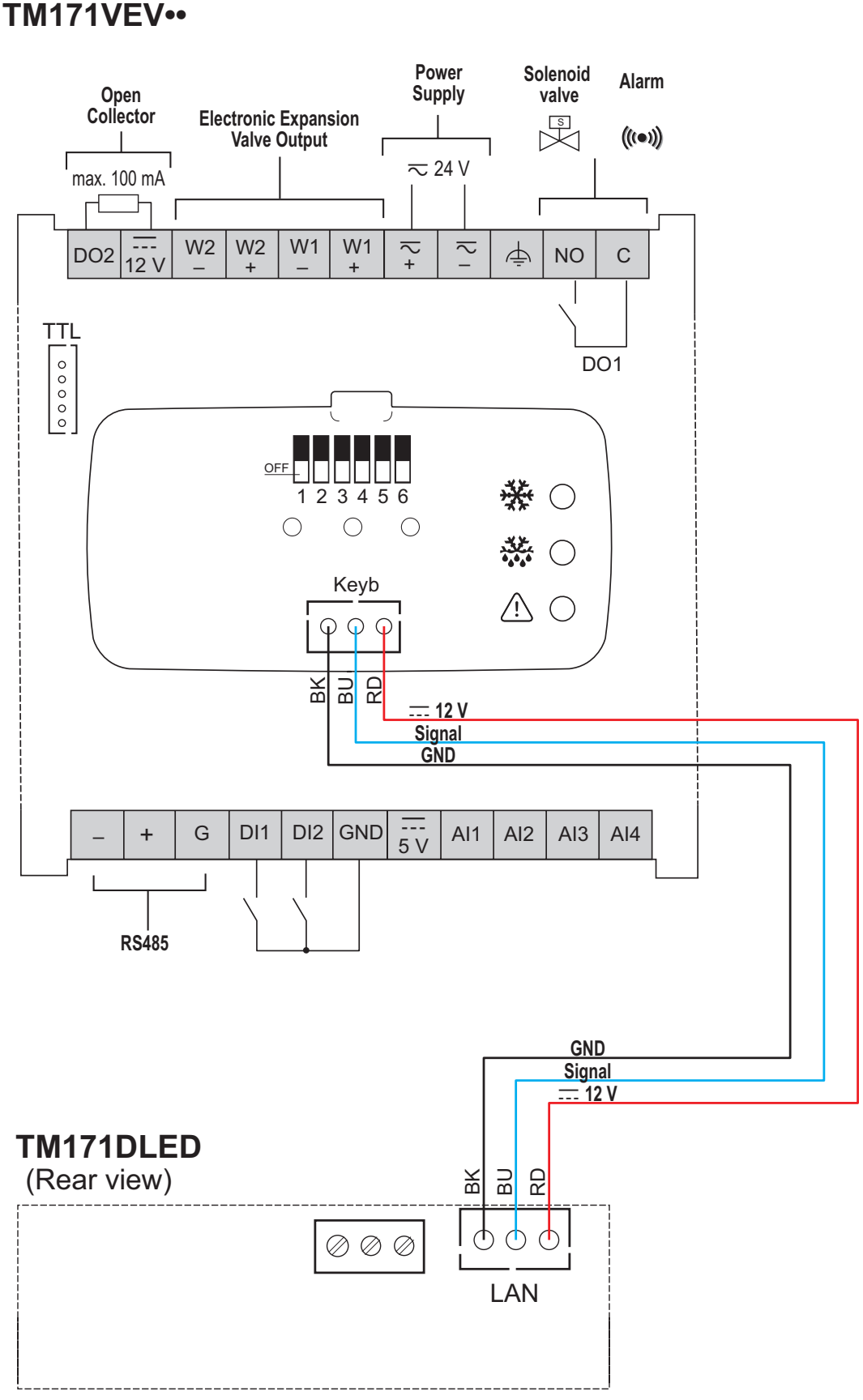


Fig. 12 TM171VEV•• - TM171DLED connection

4.4 - Compatible valve connection

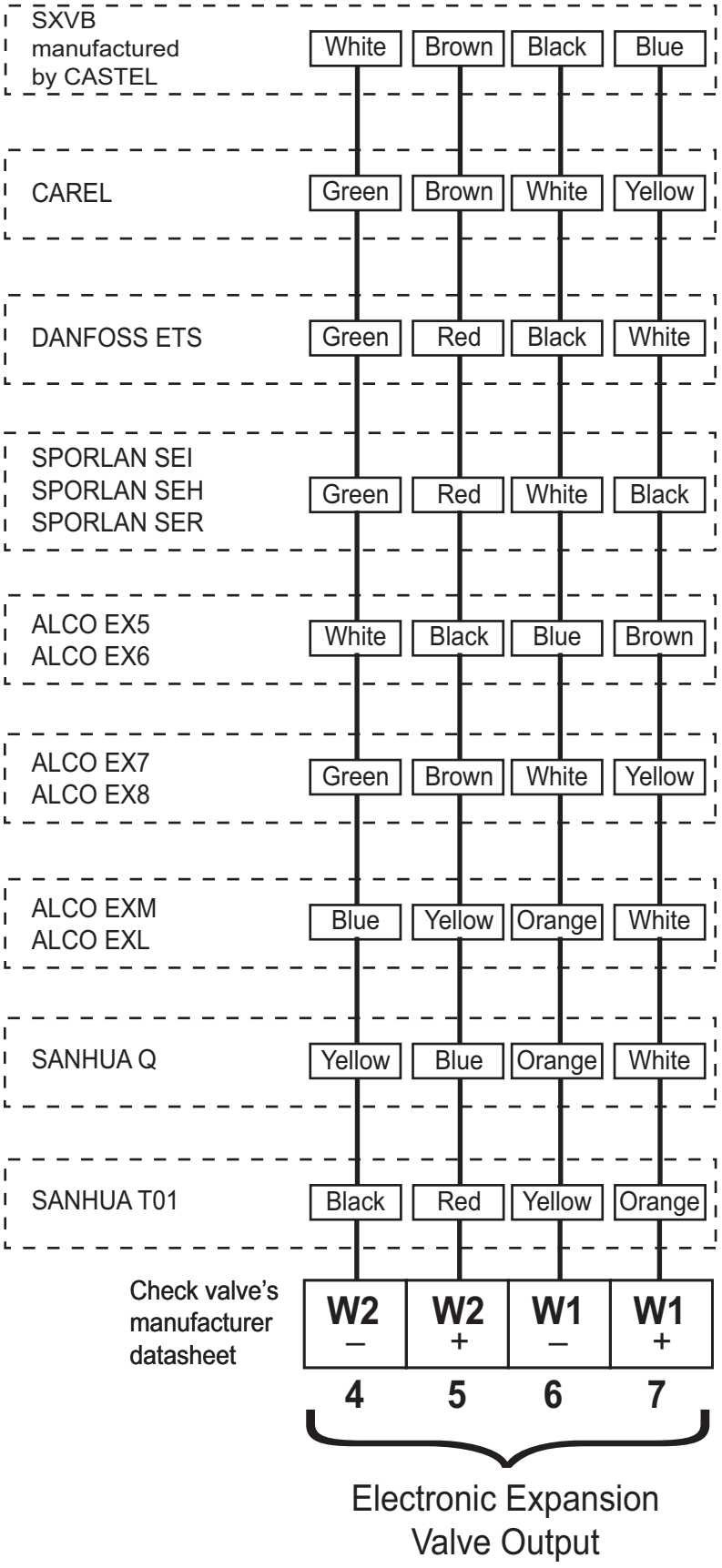


Fig. 13 Electronic Expansion Valve output

5 - TECHNICAL DATA

All **M171 Electronic Expansion Valve** drivers system components meet European Community (CE) requirements for open equipment. You must install them in an enclosure or other location designed for the specific environmental conditions and to minimize the possibility of unintended contact with hazardous voltages. Use metal enclosures to improve the electromagnetic immunity of your **M171 Electronic Expansion Valve** drivers system. This equipment meets CE requirements as indicated in the table below.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

Do not exceed any of the rated values specified within this chapter.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Applying incorrect current or voltage levels on analog inputs and outputs could damage the electronic circuitry.
Further, connecting a current input device to an analog input configure for voltage, and vice-versa, will likewise damage the electronic circuitry.

NOTICE

INOPERABLE EQUIPMENT

- Do not apply voltages above 11 Vdc to the analog inputs of the controller or Input/Output expansion module when analog input is configured as 0-10 Vdc input.
- Do not apply current above 30 mA to the analog inputs of the controller or Input/Output expansion module when analog input is configured as 0-20 mA or 4-20 mA input.
- Do not mismatch applied signal with analog input configuration.

Failure to follow these instructions can result in equipment damage.

5.1 - General specifications

The product meets the requirements of the following European Community Directives:	Directive 2006/95/EC Directive 89/108/EC
The product complies with the following Harmonised regulations	EN 60730-2-6 / EN 60730-2-9 / EN 60730-1
Use	Operating (not safety) device for incorporation
Mounting	on DIN Omega bar support
Type of action	1.B
Pollution class	2 (normal)
Over voltage category	II
Nominal pulse voltage	2500V
Digital outputs	Refer to the label on the device
Fire resistance category	D
Software class and structure	A
Type of disconnection or suspension for each circuit	Microswitch disconnection
PTI of materials used for insulation	PTI 250V
Period of electrical stress on the insulating parts	Long period

Tab. 8 Classification

	Standard	Min.	Max.
Supply voltage NON-insulated power supply	24V~/⎓ ±10%	-	-
Supply frequency	50Hz/60Hz	-	-
Power consumption	30VA / 25W	-	-
Insulation class	2	-	-
Working temperature	25 °C	-5 °C	55 °C
Operating environment humidity (non-condensing)	30 %	10 %	90 %
Storage temperature	25 °C	-20 °C	85 °C
Ambient storage humidity (non-condensing)	30 %	10 %	90 %

Tab. 9 General specifications

5.2 - Input/Output features

Type and Label	Description	TM171VEVM4	TM171VEVD4	TM171VEVA2
Digital inputs ddi1 - ddi2	2 Clean contact digital inputs closing current for ground: 0.5mA	YES	YES	NO
Dangerous voltage Digital Outputs ddO1	1 SPST relay: N.O. 5A 250V~	YES	YES	NO
Analog Inputs dAi1 - dAi2 dAi3 - dAi4	**dAi1 - dAi2** 2 configurable inputs: a) NTC temperature 103AT-2 10kΩ, extended NTC NTCAp-2 10kΩ, Pt1000 b) current input 4...20 mA / ratiometric 0-5V c) voltage input 0-10V **dAi3 - dAi4** 2 configurable inputs as NTC temperature 103AT 10kΩ or Pt1000. Measurement range: -50°C - 99.9°C;	YES	YES	Only dAi1
Open Collector non-dangerous voltage SELV digital output ddO2	1 Open Collector output Max. current 100mA Voltage 12Vcc	YES	YES	NO

Tab. 10 Input/Output features

	NTC103* -50...+99.9 °C	NTC extended* -40...+150 °C	Pt1000* -50...+99.9 °C	4...20 mA	0..10V	0-5V
AI1	✔	✔	✔	✔	✔	✔
AI2	✔	✔	✔	✔	✔	✔
AI3	✔	✔	✔	-	-	-
AI4	✔	✔	✔	-	-	-
Corrective action	0.1 °C	0.1 °C	0.1 °C	0.1bar	0.1bar	0.1bar
F.S. precision	1%	1%	1%	1%	1%	1%
Impedence	-	-	-	100Ohm	21KOhm	110KOhm
NTC: NTC 103AT-2 (10kΩ @ 25°C) BETA value 3435 **NTC extended: NTC 103AP-2 (10KΩ @ 25°C), BETA value 3435** *** probes not included - contact the Schneider Electric Sales Office for accessories**						

Tab. 11 Analog Inputs features

5.3 - Serial features

Label	Description	References
TTL (**TM171AMFK / TM171ADMI**)	TTL serial to connect Personal Computer via interface module	All references
	TTL serial to connect **TM171AMFK** to upload/ download parameters and/or applications	All references
Keyb	3-way JST connector inside the door for connection to **TM171DLED** terminal	All references
RS-485	RS-485 optoisolated on-board serial	**TM171VEVM4**

Tab. 12 Serial features

5.4 - Power Supply

The **M171 Electronic Expansion Valve** drivers and associated devices require power supplies with a nominal voltage of 24 Vac / 24 Vdc. The power supplies/transformers must be rated Safety Extra Low Voltage (SELV) according to IEC 61140. These sources of power are isolated between the electrical input and output circuits of the power supply as well as simple separation from ground (earth), PELV and other SELV systems.

⚠ ⚠ DANGER

GROUND LOOP CAUSING ELECTRIC SHOCK AND/OR INOPERABLE EQUIPMENT

- Do not connect the 0 V power supply/transformer connection supplying this equipment to any external ground (earth) connection.
- Do not connect any 0 V or ground (earth) of the sensors and actuators connected to this equipment to any external ground connection.
- If necessary, use separate power supplies/transformers to power sensors or actuators isolated from this equipment.

Failure to follow these instructions will result in death or serious injury.

If the specified voltage range is not maintained, or the effective separation of the SELV circuit connected to the concerned equipment is compromised, the products may not function as intended or may become damaged and inoperable.

⚠ WARNING

POTENTIAL OF OVERHEATING AND FIRE

- Do not connect the equipment directly to line voltage.
- Use only isolating SELV power supplies/transformers to supply power to this equipment.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

The equipment must be connected to a suitable power supply/transformers with the following features:

Primary voltage	Depending on requirements of the individual device and/or country of installation.
Secondary voltage	24 V~/⎓
Power supply frequency V~	50/60Hz
Power	35VA

5.5 - Mechanical data

Description	References
Terminals and connectors:	
1 x JST 3-way JST connector to **TM171DLED** terminal. To be used with cable **TM171ACB4OLAN**.	All references
Container:	
PC+ABS plastic resin with V0 flammability rating	All references

Tab. 13 Mechanical data

6 - USER INTERFACE

The interface, comprising the front cover of the controller, allows you to perform all operations needed to use the device.

Fig. 14 TM171VEV••

6.1 - TM171VEV•• LED

There are 3 leds on the front of the **TM171VEV••** driver which indicate the valve state.

Inside the door there are 3 more leds used to upload/download parameters and/or applications.
(see "**TM171AMFK**" chapter)

	LED	Colour	On	Flashing		Off
	EEV*	Green	Valve regulation	Valve closed (no control in progress) Setpoint satisfied		NA**
	Defrost*	Yellow	Defrosting on Valve closed (no control in progress)	No serial connection		No Defrost
	Alarm	Red	NA	Alarm present	No serial connection	No alarm

Tab. 14 TM171VEV•• LED

* On **TM171VEVA2** LED EEV and Defrost are not used
** LED off indicates driver power outage

6.2 - TM171DLED

The **TM171VEV••** driver is a blind reference, with no display. To work on the device, use the **TM171DLED** terminal.

The values shown on the **TM171DLED** terminal have up to 4 figures or 3 figures plus a sign.

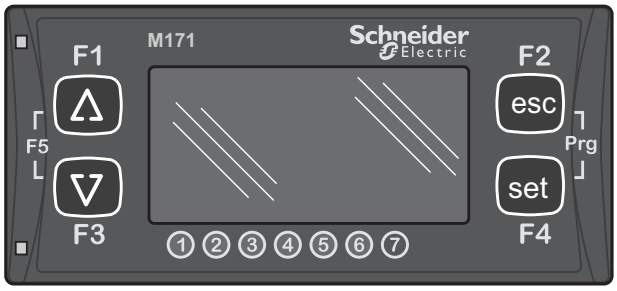


Fig. 15 TM171DLED

KEYS

	Key	Single press (press and release)	Long press
	UP	• Rapid overheating Setpoint modification* • Increase value / Move to next label	**F1**: not used
	DOWN	• Rapid overheating Setpoint modification* • Decrease value / Move to previous label	**F3**: not used
	ESC	• Exit without saving new settings • Go back to previous level	**F2**: not used
	SET	• Confirm value / exit and save new settings • Move to next level • Access to States Menu (folder, sub-folder, parameter, value)	**F4**: refer to **“6.4 - Main display settings” on page 39**
	ESC + SET	Access to Programming menu	**Prg**: refer to **“6.4 - Main display settings” on page 39**
	UP + DOWN	Acknowledged alarms	**F5**: not used

Tab. 15 Description of keys

* Also modifiable from parameter dE31 and dE32.

LED

The display shows the value/resource set for the “main display”.

If an alarm is given the E**xx** alarm code will alternate (if there are several alarms, the code with the lower value will be display).

LED			
No.	**Colour**	**Description**	**Notes**
	Red	Menu (ABC)	
	Red	Display pressure (Bar)	Values are in relative bars. If the value is PSI the symbol does not appear.
	Red	Display temperature (°C)	If the value is °F the symbol does not appear
	Red	Alarm	

Tab. 16 Description of LEDs

6.3 - Access to folders - menu structure

Folders are organised into menus.

Access to said folders is defined by the keys on the front cover as shown in **“6.2 - TM171DLED” on page 37**.

In the paragraphs that follow (or chapters indicated), we will explain how to enter each individual menu.

There are 2 menus:

- “States” menu: refer to **“6.5 - STATES menu” on page 41**;
- “Programming” menu. refer to **“6.6 - PROGRAMMING menu” on page 45**.

There are 3 folders / sub-menus in the Programming Menu:

- “Parameters” menu (PAr folder): refer to **“10 - PARAMETERS (PAr)” on page 59**;
- “MFK” menu (FnC folder): refer to **“12 - TM171AMFK (FnC FOLDER)” on page 82**;
- “PASS” password: refer to **“10 - PARAMETERS (PAr)” on page 59**.

6.4 - Main display settings

“Main Display” means what the controller on the default display screen, i.e. when no keys have been pressed.

The **TM171VEV••** main display can be customised to suit personal requirements.

Choose the required display from the “**disp**” menu.
To access the “**disp**” menu, hold down the “**set**” key for more than 3 seconds.

The main display can be selected from the following:

Label	Description*	Display value	Display value if probe in error (backup)
drE1	Temperature overheating	dAi3 Probe overheating	dAi4 Backup probe overheating
drE2	Saturation temperature of refrigerant	dAi1 Saturation probe	dAi2 Backup saturation probe
drE3	Temperature overheating Backup probe	dAi4	--- (three dashes)
drE4	Saturation temperature of refrigerant Backup probe	dAi2	--- (three dashes)
drE5*	Overheating	Difference of drE1-drE2	NA
drE6	Refrigerant Pressure	dAi1 For configuring the probe as a Saturation probe 4..20mA or ratiometric	dAi2 For configuring the probe as a backup saturation probe. 4..20mA or ratiometric If this is not done --- (three dashes)
drE7	Percentage valve opening	percentage value of valve opening (0...-100%)	--- (three dashes)

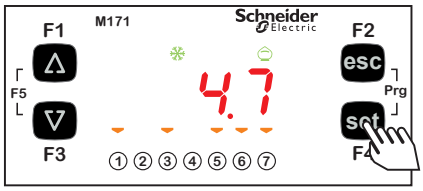
Tab. 17 Fundamental state display

* Default.

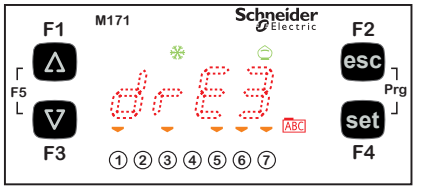
- The analog Inputs are factory-set.
- The probe display is always temperature
  (to view the pressure see **“6.5.2 - Input/Output display” on page 43**.

A step by step illustration of how to proceed is provided below.

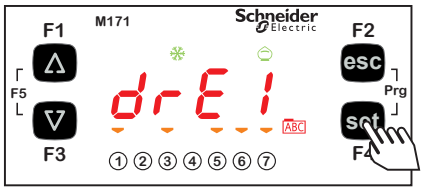
Display settings



To open the “disp” menu to modify the main display setup, press and hold the set key for at least 3 seconds.



This will open the flashing menu on the previous display (in this case drE3)



To modify the display, scroll the menu using the “UP” and “DOWN” keys and press the set key to confirm.
When you have decided the type of display (e.g. drE1), press the set key to confirm. You will be automatically returned to the main display set.

6.5 - STATES menu

The resources value can be viewed in the states menu.

The setpoint can be viewed and modified.

Resources can be present / not present depending on the reference (e.g. ddO2 is not present on **TM171VEVA2**).

Label	Setpoint				Description	Edit
rE	drE1	drE2	...	drE7	Display controller	No. In this menu only display for settings see: **“6.5.1 - Setting Setpoint” on page 41**
Ai	dAi1	dAi2	dAi3	dAi4	Analog inputs	No
di	ddi1	ddi2			Digital inputs	No
dO	ddO1	ddO2			Digital outputs	No
AL	Er01	Er02	...	Er15	Alarms	No
SP	SP1	SP2	SP3	SP4	Setpoint	Yes (not SP4)

Tab. 18 ‘States’ menu

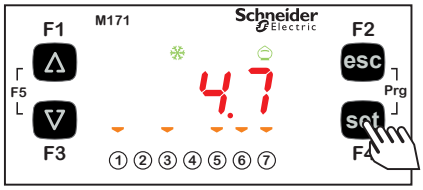
6.5.1 - Setting Setpoint

Setpoint	Description	Settable from parameter	Notes
SP1	setpoint minimum overheating	dE32	If dE30 = 1 it is understood as objective overheating. Fast modify using “UP” and “DOWN” keys.
SP2	setpoint maximum overheating	dE31	If dE32 = 0 it is understood as the only overheating setpoint.
SP3	Setpoint MOP	dE52	Expressed in temperature units.
SP4	setpoint dynamic overheating	Display only, cannot be modified. Calculated dynamically.	Valid if dE30=1. If dE30 = 0 the set is defined by dE32.

Tab. 19 Setting Setpoint

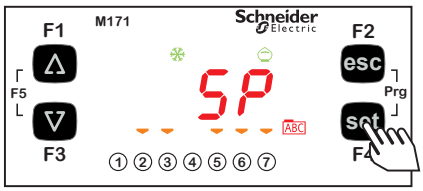
A step by step illustration of how to proceed is provided below.

Setting Setpoint

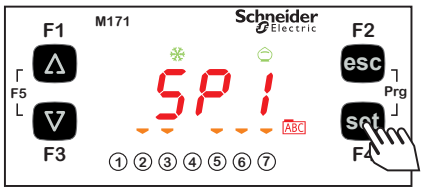


To access States Menu, press and release the “set” key
Label **rE** appears on the display.

(Use the “UP” and “DOWN” keys to scroll the other labels until you find the SP label).



Press the “set” key to view the label of the first setpoint SP1.

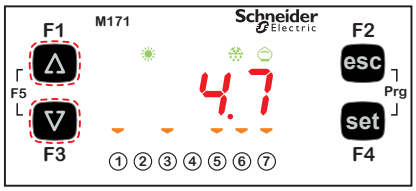


Press the “set” key again to view the value of SP1
(press the “UP” and “DOWN” keys to view the other setpoints).

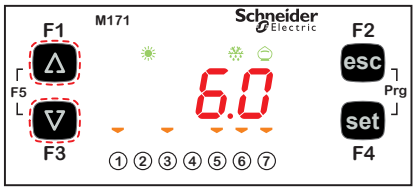
To modify the display use the “UP” and “DOWN” keys and press the “set” key to confirm.

Press “set” to confirm. You will be automatically returned to the main display set.

Fast programming of Setpoint SP1

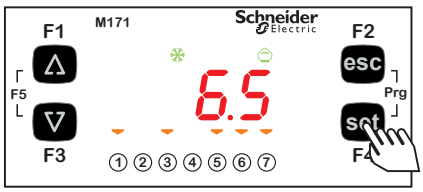


To quickly modify the setpoint use the “UP” and “DOWN” keys.



The current setpoint value will appear on the display.

To modify the value use the “UP” and “DOWN” keys and press the “set” key to confirm.



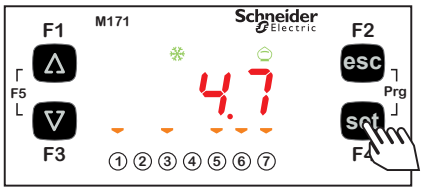
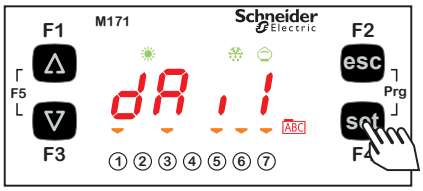
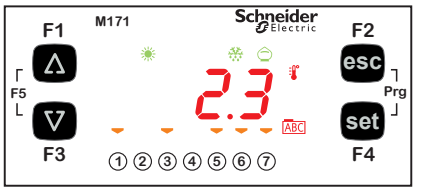
Press “set” to confirm.

You will be automatically returned to the main display set.

6.5.2 - Input/Output display

A step by step account of how to display the analog Inputs are given below.

The procedure is the same for other Inputs/Outputs*.

Input/output display	
	To access States Menu, press and release the “set” key. Label rE appears on the display. (Use the UP and DOWN keys to scroll the other labels until you reach dAi).
	Press the “set” key to view the label for the first analog Input (dAi1 in this case).
	Press the “set” key again to view the value of dAi1. Note that the °C icon lights up to indicate that the value shown is in degrees centigrade. Press the “esc” key repeatedly to go back to the main display.

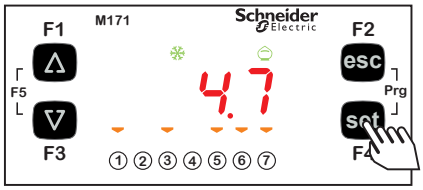
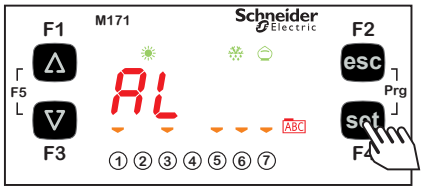
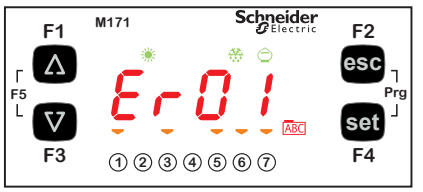
* for Digital inputs the value is:

0 = input not active (for Digital inputs this is equivalent to input open);

1 = input active (for Digital inputs this is equivalent to input short-circuited to ground).

6.5.3 - Alarm Display (AL folder)

A step by step illustration of how to proceed is provided below.

Alarm Display	
	To access States Menu, press and release the “set” key. Label **rE** appears on the display. (Use the “UP” and “DOWN” keys to browse the other labels until you find the AL label).
	Press the “set” key to view the label of the first active alarm (if it exists).
	In this case, the first alarm is Er01. Scroll using the “UP” and “DOWN” keys to find other active alarms. The menu is not cyclical . For example, if the active alarms are Er01 and Er02, the display will show: Er01 ->Er02<Er01 -> UP, <- DOWN Press the “esc” key repeatedly to go back to the main display.

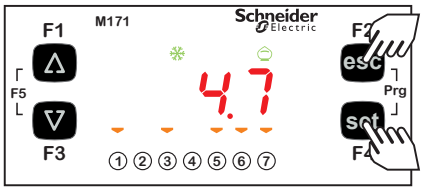
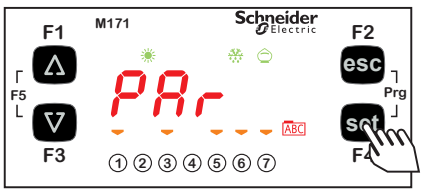
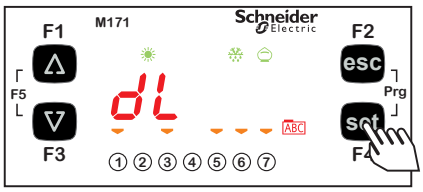
6.6 - PROGRAMMING menu

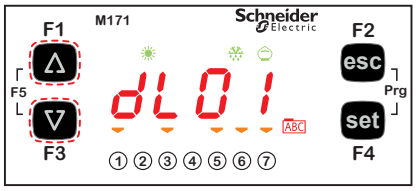
Programming menu	Label			
Parameter folder	PAr			
Parameters sub-folders	dL	dF	dE	Ui
Functions Folder	FnC			
Password folder	PASS			

Tab. 20 Programming menu

6.6.1 - Parameters (folder PAr)

A step by step illustration of how to proceed is provided below.

Modifying a parameter	
	To view the Parameters Menu (Par), press “Esc” and “Set” at the same time.
	The Parameters Menu PAr contains all controller folders. Press the “set” key to view the folders.
	The first folder the controller shows is the dL configuration folder. Press the “set” key again to modify individual dL parameters.

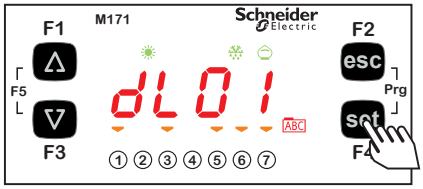


The controller will show parameter dL00 (factory default settings).

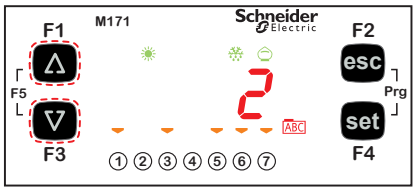
Press the “UP” key to scroll through the various parameters or move to the next parameter (dL01 in this case) or the “DOWN” key to go back to the previous parameter (dL91 in this case)

dL00->dL01->dL02->…->dL91->dL00
dL91<-dL00<-dL01<-…<-dL90<-dL91

-> UP, <- DOWN

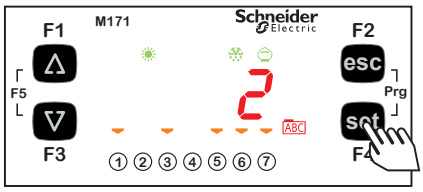


To view the parameter value (dL01 in this case), press the “set” key.



For parameter dL01, the value shown will be 2.

To change the parameter value, press the “UP” and “DOWN” keys.



Having selected a value, press the “set” key. **

To exit this display and return to the previous level, press the “esc” key.

**Pressing the set key confirms the modified value; pressing the esc key returns you to the previous level without saving the new value entered.

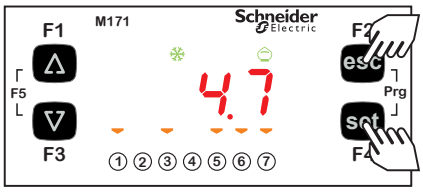
6.7 - TM171AMFK (PAr/FnC folder)

Refer to **“12 - TM171AMFK (FnC FOLDER)” on page 82**

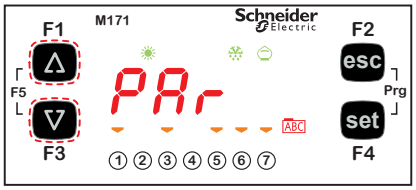
6.8 - Setting a password (Par/PASS folder)

To view parameters visible for the given password, open folder PASS (press esc and set together [esc+set] from the main display and search the folder using the “UP” and “DOWN” keys) and set the PASS value.

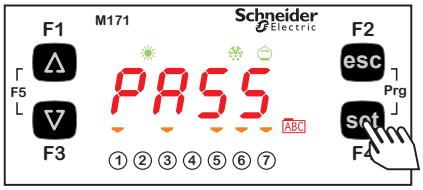
Setting the password



To view the PASS folder in the main display, press “Esc” and “Set” at the same time.



The menu showing the list of folders will be displayed. Use the “UP” and “DOWN” keys to find the PASS folder.



Press the “set” key to enter the PASS folder.

From here, set the password (installer or manufacturer), press “set” and exit.

Now access the parameters to change a value
(refer to **“10 - PARAMETERS (PAr)” on page 59**).

7 - PHYSICAL INPUT/OUTPUT CONFIGURATION

From time to time, new input modules, output modules or other devices are made available that are not documented in the following information. For information on new devices, contact your local Schneider Electric representative.

NOTICE

INOPERABLE EQUIPMENT

Update the controller firmware to the latest version every time you install a newly released Input/Output expansion module or other device to this equipment.

Failure to follow these instructions can result in equipment damage.

NOTE: For more information on how to update the controller firmware, contact your local Schneider Electric representative.

Applying incorrect current or voltage levels on analog inputs and outputs could damage the electronic circuitry.
Further, connecting a current input device to an analog input configure for voltage, and vice-versa, will likewise damage the electronic circuitry.

NOTICE

INOPERABLE EQUIPMENT

- Do not apply voltages above 11 Vdc to the analog inputs of the controller or Input/Output expansion module when analog input is configured as 0-10 Vdc input.
- Do not apply current above 30 mA to the analog inputs of the controller or Input/Output expansion module when analog input is configured as 0-20 mA or 4-20 mA input.
- Do not mismatch applied signal with analog input configuration.

Failure to follow these instructions can result in equipment damage.

7.1 - Analog inputs

There are a total of 4 Analog Inputs, referred to below as dAi1…dAi4.

Using the parameters, a physical resource (probe, digital input, voltage/current signal) can be “physically” configured for each type of input.

Inputs can be “physically” configured as specified in the following table.

PAr.	Description	0	1	2	3*	4*	5*	6
dL00	Type of analog input dAi1	Probe not configured	NTC probe	Pt1000	4-20 mA	Ratiometric 0-5V	0-10 V	NTC probe Extended
dL01	Type of analog input dAi2	Probe not configured	NTC probe	Pt1000	4-20 mA	Ratiometric 0-5V	0-10 V	NTC probe Extended
dL02	Type of analog input dAi3	Probe not configured	NTC probe	Pt1000	-	-	-	-
dL03	Type of analog input dAi4	Probe not configured	NTC probe	Pt1000	-	-	-	-

Tab. 21 Configuration of Analog Inputs

* If **dL00**/**dL01** = 3 or 4 or 5 the value read by the probe is automatically converted into a saturation temperature value.

Analog Input	Parameter	Range	Description
dAi1	dL10	dL11...999.9	Analog Input fullscale value dAi1
dAi1	dL11	-14.5...dL10	Analog Input start of scale value dAi1
dAi2	dL12	dL13...999.9	Analog Input fullscale value dAi2
dAi2	dL13	-14.5...dL12	Analog Input start of scale value dAi2

Tab. 22 Description of Analog Inputs

The values read by analogue inputs can be configured in the parameters dL20...dL23

Parameter	Description	Unit of Measure	Range
dL20	Analog Input differential dAi1	bar/PSI -°C/°F	-12.0…12.0
dL21	Analog Input differential dAi2	bar/PSI -°C/°F	-12.0…12.0
dL22	Analog Input differential dAi3	°C/°F	-12.0…12.0
dL23	Analog Input differential dAi4	°C/°F	-12.0…12.0

Tab. 23 Analog Inputs calibration

The Analog Inputs can be configured according to the following table.

PAr.	Function	Value	Description	Factory settings
dL30	Configuration of Analog Input dAi1	0...5	• **0**= disabled • **1**= evaporator output (overheating) • **2**= saturation • **3**= backup evaporator output (overheating) • **4**= backup saturation • **5**= valve opening direct control	Saturation probe
dL31	Configuration of Analog Input dAi2	0...5		Backup saturation probe
dL32	Configuration of Analog Input dAi3	0...4	• **0**= disabled • **1**= evaporator output (overheating) • **2**= saturation • **3**= backup evaporator output (overheating) • **4**= backup saturation	Evaporator output probe (overheating)
dL33	Configuration of Analog Input dAi4	0...4		Backup evaporator output probe (overheating)

Tab. 24 Configuration of Analog Inputs

7.1.1 - Valve opening direct control

If inputs Ai1 and dAi2 are “physically” configured in voltage or current, they are configurable for valve opening direct control as shown in the following table.

PAr	Function	Value
dL00	Analog Input type dAi1	3-4-5
dL01	Analog Input type dAi2	3-4-5
dL30	Configuration of Analog Input dAi1	5
dL31	Configuration of Analog Input dAi2	5

Tab. 25 Configuration of valve opening direct control

In this case the input is converted linearly as a percentage, again using the parameters:

PAr	Function	Range
dL10	Analog Input full scale value dAi1	dL11...999.9
dL11	Analog Input start of scale value dAi1	-14.5...dL10
dL12	Analog Input full scale value dAi2	dL13...999.9
dL13	Analog Input start of scale value dAi2	-14.5...dL12

Tab. 26 Configuration of valve opening direct control

You must set:

dAi1

- dL10 to a value corresponding to a signal of 10V or 20mA
- dL11 to a value corresponding to a signal of 0V or 4mA

dAi2

- dL12 to a value corresponding to a signal of 10V or 20mA
- dL13 to a value corresponding to a signal of 0V or 4mA

Valve opening percentage

- **dAi1(2) < -5.0**: a valve opening percentage of 0% is controlled with override (reset, repeated until the signal stays below -5.0)
- **-5.0< dAi1 < 0.0**: valve opening percentage of 0% is controlled
- **dAi1(dAi2) > 0.0**: the valve opening percentage is equal to the dAi1 value (dAi2).

7.2 - Digital inputs

There are of 2 no voltage digital inputs referred to below as ddi1…ddi2.

The Digital inputs can be configured as shown in the following table.

PAr.	Function	Value	Description	Notes
dL40	Configuration digital input ddi1	-7...+7	• **0** = digital input not configured • **±1** = ON/OFF adjustment • **±2** = defrost • **±3** = alarm • **±4** = system operating mode (only modes 0 and 1) • **±5** = main serial communication protocol • **±6** = ON/OFF adjustment with delay* • **±7** = complete valve opening	• The positive values (+) mean active for closed contact, the negative values (-) mean active for open contact • if configured (For values ≠ 0) the Digital inputs always have priority over any serial commands • dL40 = dL41 digital input ddL1 has priority
dL41	Configuration digital input ddi2	-7...+7		

Tab. 27 Digital Inputs configuration

*in OFF **TM171VEV••** force valve open @ 50% for 40 seconds

7.3 - Digital outputs

PAr.	Function	Value	Description	Notes
dL90	digital output configuration ddO1 (on relay)	-2…2	• **0** = output controlled from serial • **±1** = solenoid valve control • **±2** = alarm output	The positive values (+) indicate active for closed contact, the negative values (-) indicate active for open contact.
dL91	digital output configuration ddO2 (Open Collector)	-2…2	• **0** = output controlled from serial • **±1** = solenoid valve control • **±2** = alarm output	

Tab. 28 Digital output configuration

7.4 - DIP switch table

Inside the door there are 6 selectors (DIP switches) used for quick selection of refrigerant and network address and use of **TM171AMFK**.

The operations can also be done from the **TM171DLED** terminal by appropriately configuring the dF folder parameters.

The refrigerant can be selected using parameter **dE02**. In this case set the DIP switches to configuration 7 according to the table below.

Function	Configuration	Refrigerant	Selectors (DIP switches)					
			1	2	3	4	5	6
Refrigerant selection	0	R404A	-	-	-	OFF	OFF	OFF
	1	R22	-	-	-	ON	OFF	OFF
	2	R410A	-	-	-	OFF	ON	OFF
	3	R134A	-	-	-	ON	ON	OFF
	4	R744 (CO_2)	-	-	-	OFF	OFF	ON
	5	R407C	-	-	-	ON	OFF	ON
	6	R427A	-	-	-	OFF	ON	ON
	7	Set by parameter dE20 R404A default	-	-	-	ON	ON	ON
	Configuration	**Action**	**1**	**2**	**3**	**4**	**5**	**6**
Upload/Download parameters from **TM171AMFK**	8	Upload from **TM17VEV••** to **TM171AMFK**	ON	OFF	-	-	-	-
	9	Download from **TM171AMFK** to **TM17VEV••**	OFF	ON	-	-	-	-
	XVD address		**1**	**2**	**3**	**4**	**5**	**6**
Select network address	0		-	-	OFF	-	-	-
	1		-	-	ON	-	-	-

Tab. 29 DIP switch

8 - FUNCTION

8.1 - Introduction

TM171VEV•• is a stepper type electronic expansion valve that regulators the minimum overheating value at the evaporator output.

Refer to **(Fig. 16)**.

The control value is the percentage of valve opening which is translated into a percentage of valve output enabling according to the following parameters:

- **dE10** - maximum percentage of valve opening is the maximum opening of the valve;
- **dE14** - minimum useful valve opening percentage is the minimum useful valve opening;
- **dE15** - maximum useful valve opening percentage is the maximum useful valve opening.
- If the regulator controls an output of more than or equal to **dE15**, the actual output is equal to **dE10**.
- If **dE15** > **dE10** the function is ignored.
- If the regulator controls an output of less than or equal to **dE14**, the actual output is equal to 0.
- If the regulator controls an output of more than or equal to **dE10**, for more than the time set in **dE13** a maximum opening alarm **dA07** is generated to indicate a critical system situation such as insufficient load, undersizing, etc.
- To disable the signal, set **dE13**=0.

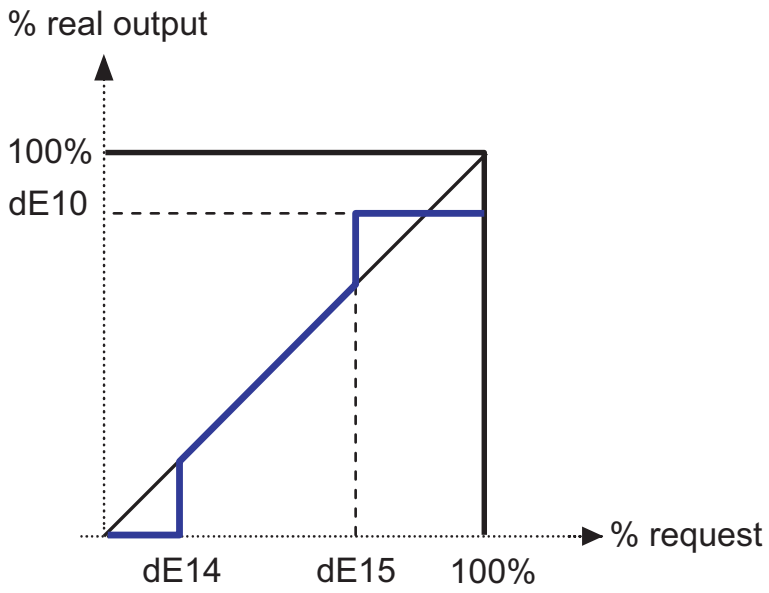


Fig. 16 Operating graph

8.2 - Saturation set

TM171VEV•• calculates the actual overheating value using the two Analog Inputs, overheating **dAi3** and saturation **dAi1**.

A PID controller modulates the valve opening so make the overheating reach the setpoint **dE32**. The algorithm is dynamic: the effective overheating value may not reach the set Setpoint or may temporarily fall below this value.

If this causes liquid to leak from the evaporator the Setpoint dE32 value must be increased.

* Valid for **dE30**=1.

8.3 - Type of system dE21

The PID configuration parameters are loaded automatically by the device selecting the type of system defined by the parameter **dE21**.

8.4 - MOP (Maximum Operating Pressure)

MOP control has a threshold set by the pressure setpoint **dE52**.

If the threshold is exceeded for more than **dE53**, a MOP alarm is generated
(refer to **“11 - ALARMS” on page 81**).

- MOP control can be enabled using parameter **dE50**.
- MOP control can be disabled when the device is switched on/after a defrost condition for an amount of time equal to **dE51**. This allows the pressure to drop below a given level when the system is switched back on.

9 - APPLICATIONS

9.1 - “Single actuator”

Refer to **(Fig. 17)**.

- The **TM171VEV••** driver controls the electronic expansion valve.
- The **TM171VEV••** driver has a 0-10V / 4…20mA input that translates a control signal from a step-step valve.

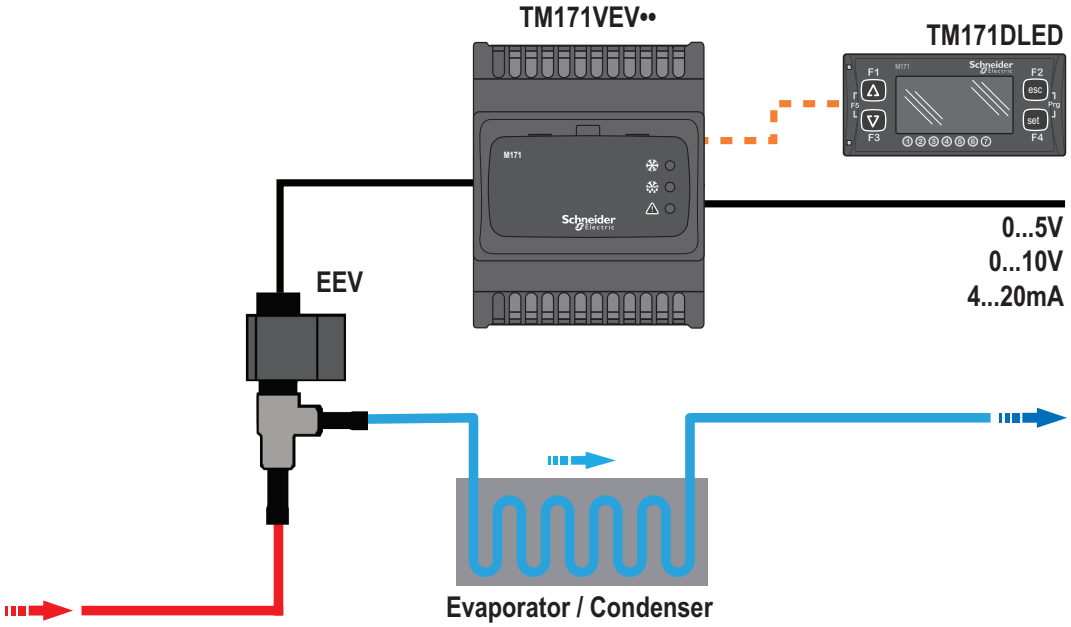


Fig. 17 Applications - single actuator

9.2 - “Stand-alone”

The regulation can be controlled via:

1. Digital Inputs - for this type of control references **TM171VEVM4**, **TM171VEVD4** are used;
2. Serial connection - for this type of control only reference **TM171VEVM4** is used.

The **TM171VEV••** driver controls the electronic expansion valve and receives the commands “defrost” and “EEV control” from:

1. Digital Inputs (refer to **“7.2 - Digital inputs” on page 52**);
2. RS485 serial.

Refer to **(Fig. 18)**.

To set parameter **dF02** refer to **“9.2.1 - Control from Digital Inputs or Serial” on page 57**.

9.2.1 - Control from Digital Inputs or Serial

Suitably set parameter dF02

- **dF02** = 0 digital input;
- **dF02** ≠ 0 serial.

If the Digital inputs are configured to ≠ 0 they always have priority over the serial command independently of dF02.

Refer to **“7 - PHYSICAL INPUT/OUTPUT CONFIGURATION” on page 48**.

The Modbus protocol selection is set from parameter **dF00**.

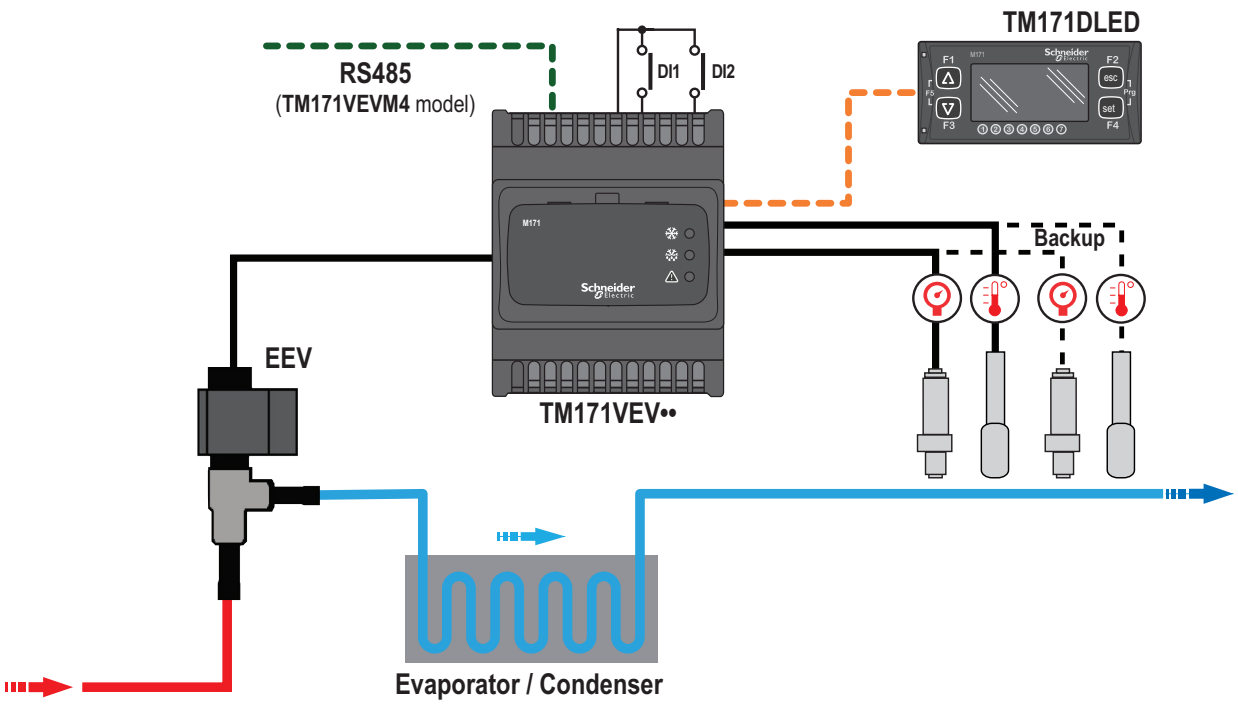


Fig. 18 Application - Stand-Alone

9.2.2 - Digital inputs regulation

Value dL40/dl41			Notes
±1	ON	Enabling regulation	Forcing valve opening to value: **dE11 - Valve actuation percentage after blackout** For a time: **dE35 - Valve opening freezing timer after OFF->ON**
	OFF	Disabling regulation	Valve closing (save the current percentage in **dE11**)
±2	ON	Defrosting on	Valve closing The configured digital input ±1 is ignored until the end of defrost At the end of defrost the valve opening is forced to the value set by: **dE12 - Valve actuation percentage after defrost (If ≠ 0)** Otherwise see **dE11**
	OFF	No defrost	-
±3	ON	Alarm active	Valve closing
	OFF	Alarm not active	-
±4	ON	Factory set regulation enabled	Control enabled with profile defined by **dE22 - Type of system operating mode 1**
	OFF		Control enabled with profile defined by **dE21 - Type of system operating mode 0**
±5	ON	Protocol setting for main serial communication	Modbus protocol with data parameters from **dF30, dF31, dF32**
	OFF		The communication protocol is set by **dF00**
±6	ON	Enabling regulation	Forcing valve opening to value: • used prior to the last OFF if **dE11 = 0** • dE11 if **dE11 ≠ 0** for a time: **dE35 if the overheating is > dE32** After the opening value the control starts, changing the enabling percentage to maintain the current overheating set-point (or, if required, it enters MOP regulation)
	OFF	Disabling regulation	Having saved the opening percentage: • valve closure • solenoid valve closure (if driver is configured) • valve regulator disabling
±7	ON	Valve opening at 100%	The valve opening is forced at 100% whatever the opening of the other regulators, except if the alarms force the valve to close
	OFF	The valve control returns to the current regulator	The manual/automatic (bumpless) passage starts from a 100% valve opening

Tab. 30 Regulation of digital inputs

9.2.3 - RS485 Serial regulation

With an RS485 serial it is possible to control the regulation from the serial in the same way described in:
“9.2.2 - Digital inputs regulation” on page 58.

It is also possible to enable operating modes 2 and 3 (parameters **dE23**, **dE24**) which are not available for Digital inputs.

10 - PARAMETERS (PAr)

The parameters can be set to fully configure the **TM171VEV••** driver.

The parameters can be modified via:

- **TM171AMFK** (MFK);
- keys on the **TM171DLED** terminal;
- Personal Computer.

The following sections provide a detailed analysis of each parameter, divided into categories (folders).

Each folder is designated with a label showing 2 figures (example: dF, UI, etc.).

Folder label	Meaning of label	Parameters of
dL	driver Locator configuration	I/O configuration
dF	driver protocol configuration	Protocol Configuration
dE	driver valve configuration	Valve configuration
Ui	User interface	User interface

Tab. 31 Parameters (PAr)

Unless otherwise indicated, the parameter is always visible and modifiable, unless customized settings have been configured via serial.

Both parameters and folder visibility can be controlled (See Folder table).
If folder visibility is modified, the new setting will apply to all parameters in the folder.

10.1 - Levels of visibility

There are 4 levels of visibility that can be set by assigning appropriate values to each parameter in the folder, only via serial, software (DeviceManager or other communication SW) or programming key.

The visibility levels are:

- value 3 = parameter or folder always visible;
- value 2 = manufacturer level; these parameters can only be viewed by enter the manufacturer's password (see parameter **Ui28**) (all parameters specified as always visible, parameters visible at installer level and manufacturer level will be visible);
- value 1 = installer level; these parameters can only be viewed by enter the installation password (see parameter **Ui27**) (all parameters specified as always visible, and parameters visible at installer level will be visible);
- value 0 = parameter or folder NOT visible.

Parameters and/or folders with a level of visibility other than 3 (password-protected) will be visible only if the correct password is entered (installer or manufacturer) following this procedure.

Parameters and/or folders with a level of visibility = 3 are always visible even without a password: in this case, the following procedure is not necessary.

10.2 - Parameter table/visibility, display folder table and Client table

The tables below list all information required to read, write and decode all accessible resources in the device.

There are 3 tables:

- the **parameter table** lists all controller configuration parameters saved in the non-volatile memory, including visibility;
- the **folder table** lists all parameter folder visibility details;
- the **client table** includes all I/O and alarm status resources available in the volatile memory of the instrument.

Description of columns:

Description of columns contains a legend to explain parameter table.

FOLDER	This Indicates the label of the folder containing the parameter in question.
LABEL	This indicates the label used to display the parameters in the menu of the controller.
PAR. ADDR.	The whole part represents the address of the MODBUS register containing the value of the resource to be read or written in the controller. The value after the point indicates the position of the most significant data bit inside the register; if not indicated it is taken to be zero. This information is always provided when the register contains more than one information item, and it is necessary to distinguish which bits actually represent the data (the working size of the data indicated in the column DATA SIZE is also taken into consideration). Given that the modbus registers have the size of one WORD (16 bit), the index number after the point can vary from 0 (least significant bit –LSb–) to 15 (most significant bit –MSb–).
VIS. PAR. ADDR.	The same as above. In this case, the MODBUS register address contains the visibility value of the parameter. By default all parameters have: • Data size: 2 bit • Range: 0…3 • Visibility: * 3 • U.M.: num * Refer to **"6.8 - Setting a password (Par/PASS folder)" on page 47**.
RESET (Y/N)	Indicates whether the device MUST be rebooted after the parameter has been changed; • Y=YES the device MUST be rebooted to save the change; • N=NO the device DOES NOT need to be rebooted after changing the parameter.
R/W	Indicates if resources are read/write, read-only or write-only: • R: the resource is read-only; • W: the resource is write-only; • RW: the resource is both read and write.
DATA SIZE	Indicates the size of the data in bits. • WORD = 16 bit • Byte = 8 bit • "n" bit = 1...15 bit based on the value of "n"
DESCRIPTION	This is the description of parameter functionality
RANGE	Describes the interval of values that can be assigned to the parameter. It can be correlated with other instrument parameters (indicated in the parameter label). If the real value is outside the permitted limits for the parameter (for example, because other parameters defining the limits have been changed), the limit that has been passed and not the actual value will be displayed.
CPL	When the field indicates "Y", the value read by the register needs to be converted because the value represents a number with a sign. In other cases the value is always positive or null. To carry out the conversion, proceed as follows: • if the value in the register is between 0 and 32,767, the result is the value itself (zero and positive values); • if the value in the register is between 32,768 and 65,535, the result is the value of the register – 65,536 (negative values)
EXP	If -1 is the value read from the register, divide by 10 (value/10) to convert it to the values given in the RANGE and DEFAULT columns and the unit of measurement specified in the U.M. column.

TM171VEVM4	Indicates the factory setting for the **TM171VEVM4** reference. **Example.** Parameter dL01 = 50.0. Column EXP = -1: • The value read by the device is 50.0; • The value read by the register is 500 --> 500/10 = 50.0.
TM171VEVD4	Indicates the factory setting for the **TM171VEVD4** reference. Same as **TM171VEVM4**.
TM171VEVA2	Indicates the factory setting for the **TM171VEVA2** reference. Same as **TM171VEVM4**.
M.U.	Unit of measurement for values converted according to the rules indicated in the CPL column The unit of measurement shown is for example purposes only, as it may change depending on the application (e.g. parameters with a UoM in °C/bar could also have %RH)

Examples for PAR ADDR. (in binary form the least significant bit is the first on the right):

ADDR	DATA SIZE	Value	Content of register	
8806	WORD	1350	1350	0000010101000110)
8806	Byte	70	1350	(00000101**01000110**)
8806.8	Byte	5	1350	(**00000101**01000110)
8806.14	1 bit	0	1350	(0**0**000010101000110)
8806.7	4 bits	10	1350	(00000**1010**1000110)

Tab. 32 Description of columns

IMPORTANT: when the register contains more than one piece of data, the write procedure is as follows:

1. read current register value;
2. modify the bits for the resource concerned;
3. write the register.

Examples for VIS. PAR. ADDR. (in binary form the least significant bit is the first on the right):

ADDR	DATA SIZE	Value	Content of register	
49482	2 bit	0	120	(0000000001111**00**)
49482.2	2 bit	2	120	(0000000001111**0**000)
49482.4	2 bit	3	120	(000000000**11**1000)
49482.6	2 bit	1	120	(00000000**01**111000)

Tab. 33 Default visibility

ADDR	DATA SIZE	Value	Content of register	
49484	2 bit	0	72	(000000000**00**1000)

Tab. 34 Visibility modified

10.2.1 - Parameter table / visibility

In the **TM171VEVD4** reference, changing parameter values can cause drivers to stop working while waiting for external input via RS485 (RS485 not supported on this reference).

In the **TM171VEVA2** reference, changing parameter values can cause the same problem as the **TM171VEVD4** reference, but also cause equipment to become permanently inoperable (the drivers no longer manage the system as expected and this can cause damage to external devices, e.g., the compressor).

NOTICE

INCORRECT CONFIGURATION OF PARAMETERS

Do not change the value of the parameters present in **GREY** cells.

Failure to follow these instructions can result in equipment damage.

LABEL	PAR. ADDR	VIS. PAR. ADDR	RESET (Y/N)	R/W	DATA SIZE	DESCRIPTION	RANGE	CPL	EXP	TM171VEVM4	TM171VEVD4	TM171VEVA2	M.U.
'dF' FOLDER													
dF00	49158	49434.6	N	RW	BYTE	Select COM0 protocol • **0** = RESERVED; • **1** = MODBUS; • **2** = NOT USED • **3** = NOT USED	0...3			1	1	1	num
dF02	49200	49435.2	N	RW	BYTE	Control from digital inputs or serial port. • **0** = digital input • **1** = RS485 (reference **TM171VEVM4**) • **2*** = RS485 + shared probe (reference **TM171VEVM4**) • **3*** = digital input + shared probe *shared probe refers to a value written via serial to dedicated addresses, for the temperature/pressure probes configured appropriately but not connected. **Note**: IF **dL40** and/or **dL41** ≠ 0 the control comes from the serial. The Digital inputs DI1, DI2 (when appropriately configured ≠ 0) in any case ALWAYS have priority over the commands received from the serial.	0...3			1	0	0	num
dF20	49172	49437	N	RW	BYTE	Eliwell protocol controller address. **dF20=** address of the device within the family (valid values from 0 to 14) **dF21** = device family (valid values from 0 to 14) The two values **dF20** and **dF21** represent the network address of the device and the pair are indicated in the following format: "FF.DD" (where FF = **dF21** and DD = **dF20**).	0...14			0	0	0	num
dF21	49173	49437.2	N	RW	BYTE	Eliwell protocol controller family. See **dF20.**	0...14			0	0	0	num
dF30	49175	49437.6	Y	RW	BYTE	Modbus protocol controller address.	0...255			1	1	1	num

LABEL	PAR. ADDR	VIS. PAR. ADDR	RESET (Y/N)	R/W	DATA SIZE	DESCRIPTION	RANGE	CPL	EXP	TM171VEVM4	TM171VEVD4	TM171VEVA2	M.U.
dF31	49176	49438	Y	RW	BYTE	Modbus protocol Baudrate • **0** = 1200 baud • **1** = 2400 baud • **2** = 4800 baud • **3** = 9600 baud • **4** = 19200 baud • **5** = 38400 baud • **6** = 57600 baud • **7** = 115200 baud	0...7			3	3	3	num
dF32	49177	49438.2	Y	RW	BYTE	Modbus protocol parity • **0** = NONE • **1** = EVEN (parity) • **2** = ODD (disparity)	0...2			1	1	1	num
dF60	16426	49440	N	RW	WORD	Client code 1	0...999			0	0	0	num
dF61	16428	49440	N	RW	WORD	Client code 2	0...999			0	0	0	num
						‘dL’ FOLDER							
dL00	50894	49429.2	Y	RW	BYTE	Analog Input type **dAi1**. • **0** = Probe not configured • **1** = NTC • **2** = Pt1000 • **3** = 4..20mA • **4** = Ratiometric transducer 0-5V • **5** = 0-10V • **6** = NTC extended	0...6			3	3	5	num
dL01	50895	49429.4	Y	RW	BYTE	Analog Input type dAi2. See **dL00.**	0...6			3	3	0	num
dL02	50896	49429.6	Y	RW	BYTE	Analog Input type **dAi3** • **0** = Probe not configured • **1** = NTC • **2** = Pt1000 • **3, 4, 5** = NOT USED • **6** = NTC extended	0...6			1	1	0	num
dL03	50897	49430	Y	RW	BYTE	Analog Input type **dAi4**. See **dL02**	0...6			1	1	0	num
dL08	50923	49430.2	N	RW	BYTE	°C/°F selection. **0**= °C; **1**= °F.	0...1			0	0	0	flag
dL09	50924	49430.4	N	RW	BYTE	Pressure unit of measure. **0**= bar **1**= PSI.	0...1			0	0	0	flag
dL10	18130	49430.6	N	RW	WORD	Analog Input fullscale value **dAi1**.	**dL11**...9999	Y	-1	70	70	1000	bar/PSI
dL11	18140	49431	N	RW	WORD	Analog Input start of scale value **dAi1**.	-145...**dL10**	Y	-1	-5	-5	0	bar/PSI
dL12	18132	49431.2	N	RW	WORD	Analog Input full scale value **dAi2**.	**dL13**...9999	Y	-1	70	70	1000	bar/PSI
dL13	18142	49431.4	N	RW	WORD	Analog Input start of scale value **dAi2**.	-145...**dL12**	Y	-1	-5	-5	0	bar/PSI
dL20	50918	49431.6	Y	RW	BYTE	Analog Input differential **dAi1**.	-120...120	Y	-1	0	0	0	bar/PSI °C/°F
dL21	50919	49432	Y	RW	BYTE	Analog Input differential **dAi2**.	-120...120	Y	-1	0	0	0	bar/PSI °C/°F
dL22	50920	49432.2	Y	RW	BYTE	Analog Input differential **dAi3**.	-120...120	Y	-1	0	0	0	°C/°F
dL23	50921	49432.4	Y	RW	BYTE	Analog Input differential **dAi4**.	-120...120	Y	-1	0	0	0	°C/°F
dL30	50934	49432.6	N	RW	BYTE	Configuration of Analog Input **dAi1**. • **0**= disabled • **1**= evaporator output (overheating) • **2**= saturation • **3**= backup evaporator output (overheating) • **4**= backup saturation • **5**= valve opening direct control	0...5			2	2	5	num
dL31	50935	49433	N	RW	BYTE	Configuration of Analog Input dAi2. See **dL30.**	0...5			4	4	0	num

LABEL	PAR. ADDR	VIS. PAR. ADDR	RESET (Y/N)	R/W	DATA SIZE	DESCRIPTION	RANGE	CPL	EXP	TM171VEVM4	TM171VEVD4	TM171VEVA2	M.U.
dL32	50936	49433.2	N	RW	BYTE	Configuration of Analog Input **dAi3**. • **0**= disabled • **1**= evaporator output (overheating) • **2**= saturation • **3**= backup evaporator output (overheating) • **4**= backup saturation	0...4			1	1	0	num
dL33	50937	49433.4	N	RW	BYTE	Configuration of Analog Input dAi4. See **dL32.**	0...4			3	3	0	num
dL40	50926	49433.6	Y	RW	BYTE	Configuration of digital input **ddi1** • **0** = digital input not configured • **±1** = ON/OFF adjustment • **±2** = defrost • **±3** = alarm • **±4** = system operating mode (only modes 0 and 1) • **±5** = main serial communication protocol • **±6** = ON/OFF adjustment with delay (OFF → valve open 50% for 40 secs) • **±7** = complete valve opening	-7...7	Y		0	1	0	num
dL41	50927	49434	Y	RW	BYTE	Configuration of digital input **ddi2**. See **dL40.**	-7...7	Y		0	2	0	num
dL90	50940	49434.2	Y	RW	BYTE	Digital outputs configuration **ddO1** (relay) • **0** = output controlled from serial • **±1** = solenoid valve control • **±2** = alarm output	-2...2	Y		1	1	0	num
dL91	50941	49434.4	Y	RW	BYTE	Digital output configuration **ddO2** (**O.C.**) See **dL90.**	-2...2	Y		0	0	0	num
'dE' FOLDER													
dE00	49201	49442	Y	RW	BYTE	Valve reference See **"10.2.2 - Valve configuration parameters" on page 69** • **0**= customisable (see **"10.2.3 - Valve configuration parameter table dE01...dE09, dE80 con dE00 = 0" on page 70**) For values from 1 to 15 see **"10.2.4 - Valve configuration parameter table dE01...dE09, dE80 con dE00 ≠ 0" on page 72** • **1** = DANFOSS ETS50 • **2** = DANFOSS ETS100 • **3** = ALCO EX4 EX5 EX6 • **4** = NOT USED • **5** = ALCO EX7 • **6** = ALCO EX8 • **7** = CAREL E2V E3V E4V E5V E6V E7V • **8** = SPORLAN SER 1.5 TO 20 • **9** = SPORLAN SEI-30 • **10** = SPORLAN SEI-50 • **11** = NOT USED • **12** = SPORLAN SER(I) G, J, K, B, C, D • **13** = ALCO EXM246 • **14** = SANHUA DPF(Q)/DPF(T01) • **15** = SXVB manufactured by CASTEL	0...15			8	8	8	num

LABEL	PAR. ADDR	VIS. PAR. ADDR	RESET (Y/N)	R/W	DATA SIZE	DESCRIPTION	RANGE	CPL	EXP	TM171VEVM4	TM171VEVD4	TM171VEVA2	M.U.
For the description of parameters **dE01...dE09, dE80** see: **“10.3.4. Valve configuration parameter table dE01...dE09, dE80 con dE00 = 0” on page 58. Parameters dE01…dE09/dE80 are visible and settable from the keyboard only if dE00=0.**													
dE10	49208	49442.2	N	RW	BYTE	**Maximum valve opening percentage** Defines the maximum valve opening value, meaning the actuation limits in percentages. 0 indicates valve completely closed.	0...100			100	100	100	%
dE11	49209	49442.4	N	RW	BYTE	**Valve actuation percentage after blackout** Value calculated automatically but settable using this parameter for first start-up.	0...100			0	0	0	%
dE12	49210	49442.6	N	RW	BYTE	**Valve actuation percentage after defrost** Value calculated automatically by settable via this parameter for first start-up. If **dE12**=0 the percentage is defined by **dE11**.	0...100			0	0	0	%
dE13	49211	49443	N	RW	BYTE	**Operating time at max opening for alarm signal** if the valve opening remains at a value of greater than **dE10** for the time set by **dE13** a maximum opening alarm will be given **dA07** (see “Alarms chapter”) If **dE13**=0 signal disabled.	0...255			60	60	60	min
dE14	49212	49443.2	N	RW	BYTE	**Minimum valve useful opening percentage** If the regulator commands an output of less than or equal to **dE14**, the actual output = 0.	0...**dE15**			0	0	0	%
dE15	49213	49443.4	N	RW	BYTE	**Maximum valve useful opening percentage** If the regulator commands an output of more than or equal to **dE15** the actual output is **dE10** (with **dE15** < **dE10**). Ignored if **dE15** > **dE10**.	**dL14**...**dL10**			100	100	100	%
dE16	49214	49443.6	N	RW	BYTE	**Valve opening percentage during probe error** If a probe error sets the valve opening, in percentage, for a time **dE13**.	0...100			0	0	0	%
dE19	49222	49444	N	RW	BYTE	**Tolerance on winding resistance Stepper motor**	0...255			65	65	65	%
dE93	49231	49444.2	N	RW	BYTE	**Period of motor enabling/disabling** Sets the enabling/disabling cycle (Duty cycle) of the stepper motor. See **dE08**	0...255			10	10	10	secs*10
dE20	49215	49444.4	N	RW	BYTE	**Select type of gas** Use only if the configuration via Dip Switch is set to 7. If not **dE20** will be ignored. • **0 = R404A;** • **1 = r22;** • **2 = R410a;** • **3 = R134a;** • **4 = R744 (C02);** • **5 = R407C;** • **6 = R427A;** • **7 = customisable**	0...7			7	7	30	num

LABEL	PAR. ADDR	VIS. PAR. ADDR	RESET (Y/N)	R/W	DATA SIZE	DESCRIPTION	RANGE	CPL	EXP	TM171VEVM4	TM171VEVD4	TM171VEVA2	M.U.
dE21	49216	49444.6	N	RW	BYTE	Type of system operating mode 0 • **0** = User setting • **1** = ducted refrigeration unit and evaporation pressure quickly modifiable (e.g. step control) • **2** = ducted refrigeration unit and evaporation pressure controlled (e.g. INVERTER control) • **3** = refrigeration unit with on-board compressor • **4** = refrigeration unit with on-board compressor and renewing exchanger • **5, 6** = NOT USED • **7** = conditioning unit with plate exchanger • **8** = conditioning unit with shell and tube exchanger • **9** = conditioning unit with ribbed battery exchanger • **10** = conditioning unit with variable refrigerating capacity • **11** = perturbed conditioning unit • **12, 13, 14, 15, 16** = NOT USED	0...16			7	7	7	num
dE22	49225	49445	N	RW	BYTE	Type of system operating mode 1. See **dE02**	0...16			7	7	7	num
dE23	49226	49445.2	N	RW	BYTE	Type of system operating mode 2. See **dE02**	0...16			7	7	7	num
dE24	49227	49445.4	N	RW	BYTE	Type of system operating mode 3. See **dE02**	0...16			7	7	7	num
dE30	49308	49445.6	N	RW	BYTE	Enable overheating recalculation reference. Used to enable the automatic recalculation of the referred Setpoint in order to regulate the overheating. **0**= recalculation disabled. (Setpoint = **dE31**); **1**= automatic recalculation enabled	0...1			0	0	0	flag
dE31	16512	49446	N	RW	WORD	Overheating upper threshold Used to set the setpoint SP4 to **dE31** (SP2) to regulate the overheating following a black-out or at the end of defrost. Active for the time set by **dE51** (or when the MOP function is disabled)	0...1000		-1	60	60	60	°C/°F
dE32	16510	49446.2	N	RW	WORD	Overheating lower threshold Used to set the setpoint SP2 to regulate the overheating (objective overheating) If **dE30**=1 and the calculated setpoint <**dE32**, then the dynamic setpoint will be = **dE32**.	0...1000		-1	60	60	60	°C/°F
dE33	16514	49446.4	N	RW	WORD	Overheating reference recalculation period Valid for **dE30**=1. Defines the recalculation period of the dynamic setpoint (every **dE33** seconds).	0...999			20	20	20	secs
dE34	16516	49446.6	N	RW	WORD	Overheating recalculation step. Dynamic setpoint varies by **dE34** degrees according to the overheating value compared to **dE32**.	0...1000		-1	1	1	1	°C/°F
dE35	16470	49447	N	RW	WORD	Valve opening freezing timer after OFF->ON	0...1999			0	0	0	secs
dE36	16518	49447.2	N	RW	WORD	Overheating proportional band	-9999...-1	Y	-1	-100	-100	-100	K
dE37	16520	49447.4	N	RW	WORD	Overheating full time	0...1999			40	40	40	secs
dE38	16522	49447.6	N	RW	WORD	Overheating derivative time	0...1999			0	0	0	secs

LABEL	PAR. ADDR	VIS. PAR. ADDR	RESET (Y/N)	R/W	DATA SIZE	DESCRIPTION	RANGE	CPL	EXP	TM171VEVM4	TM171VEVD4	TM171VEVA2	M.U.
dE47	49329	49450	N	RW	BYTE	Enable valve manual opening **0=** automatic valve opening; **1=** manual valve opening	0...1			0	0	0	flag
dE48	16546	49450.2	N	RW	WORD	Valve manual opening **Note**: valid if **dE47=**1. **Note**: valve opening switched from automatic to manual (**dE47=**1) the opening percentage is not 0% as per default parameter but the percentage indicated by this parameter	0.0...100.0		-1	0	0	0	%
dE50	49270	49450.4	N	RW	BYTE	Enable MOP **0=** MOP disabled; **1** = MOP enabled.	0...1			0	0	0	flag
dE51	16478	49450.6	N	RW	WORD	MOP disable duration at start-up. MOP activation delay on switching-on or after defrost.	0...999			0	0	0	secs
dE52	16472	49451	N	RW	WORD	Evaporator temperature upper threshold MOP setpoint	-60.0...100.0	Y	-1	0	0	0	°C/°F
dE53	49271	49451.2	N	RW	BYTE	Min time that temp upper threshold is exceeded for alarm activation If the **dE52** threshold is exceeded for longer than **dE53** the MOP alarm is given.	0...255			180	180	180	secs
'Ui' FOLDER													
Ui27	17988	49458.6	N	RW	WORD	Installation password	0...255			1	1	1	num
Ui28	17990	49459	N	RW	WORD	Manufacturer password	0...255			2	2	2	num

Tab. 35 Parameters / visibility

10.2.2 - Valve configuration parameters

dE00	Type of VALVE	dE01	dE02	dE03	dE04	dE05	dE06	dE07	dE08	dE09	dE80
-		steps/s	steps	steps	mA	Ohm	mA	num	%	10*ms/step	steps/s
0	**Customisable**	200	1596	100	120	100	50	0	100	50	10
1	**DANFOSS** ETS50	160	2625	160	100	52	75	0	100	50	15
2	**DANFOSS** ETS100	300	3530	160	100	52	75	0	100	50	10
3	**ALCO** EX4 EX5 EX6	500	750	100	500	13	100	0	100	50	10
4	VALUE NOT USED	-	-	-	-	-	-	-	-	-	-
5	**ALCO** EX7	210	1600	100	750	8	250	0	100	50	10
6	**ALCO** EX8	500	2600	100	800	6	500	0	100	50	10
7	**CAREL** E2V-E3V-E4V E5V-E6V-E7V	45	480	70	450	36	100	5	30	250	10
8	**SPORLAN** SER	200	1596	100	120	100	50	0	100	50	10
9	**SPORLAN** SEI-30	200	3193	100	160	75	50	0	100	50	10
10	**SPORLAN** SEI-50 SEH*	200	6386	100	160	75	50	0	100	50	10
11	VALUE NOT USED	-	-	-	-	-	-	-	-	-	-
12	SPORLAN SER(I) G, J, K, B, C, D	160	2500	100	120	100	50	0	100	255	12
13	**ALCO** EXM246-EXL246	45	250	100	65	250	65	1	100	50	10
14	**SANHUA** DPF(Q)-DPF(T01)	40	250	50	105	92	35	1	100	50	10
15	ELIWELL **SXVB** manufactured by CASTEL	20	195	60	-200	54	50	0	100	50	10

Tab. 36 Valve configuration parameters

*Sporlan SEH: bipolar reference only

10.2.3 - Valve configuration parameter table dE01...dE09, dE80 con dE00 = 0

NOTE: The parameter visibility cannot be set via the serial.
Check the data given in the valve manufacturer's manual for the correct configuration.

dE00	LABEL	PAR. ADDR	R/W	DATA SIZE	DESCRIPTION	RANGE	CPL	EXP	TM171VEVM4	TM171VEVD4	TM171VEVA2	M.U.
0	dE01	16722	RW	WORD	**Stepper motor maximum speed** Defines the maximum valve motor speed to guarantee step precision and integrity	0...9999			200	200	200	steps/s
0	dE02	16754	RW	WORD	**Stepper motor complete opening** Defines the maximum number of valve steps. The total travel refers to the FULL STEP mode (**dE07** = 0). The valve opening is complete when this value is reached.	0...9999			1596	1596	1596	steps
0	dE03	49553	RW	BYTE	**Stepper motor extra movement in total closure** Defines the number of extra valve steps beyond the limit switch to guarantee correct total closure. A total closure command implies the valve positioned to zero and a further number of steps **dE03**.	0...255			100	100	100	steps
0	dE04	16802	RW	WORD	**Stepper motor winding maximum current** Defines the maximum current for the phase used by the valve (maximum torque). Negative current value: the maximum current will be set to the value with no sign (absolute) **dE04** with an extra 50% with the valve movement command (starting or end point) within 5% of total opening, to a value equal to the absolute value of **dE04** for the other movements.	-1999...9999			120	120	120	mA
0	dE05	49601	RW	BYTE	**Stepper motor winding resistance** Defines the electrical resistance of the single phase winding (verify connections)	0...255			100	100	100	ohm
0	dE06	16850	RW	WORD	**Stepper motor winding rated current** Defines the phase circulating current in the valve stop condition (minimum torque)	0...9999			50	50	50	mA

dE00	LABEL	PAR. ADDR	R/W	DATA SIZE	DESCRIPTION	RANGE	CPL	EXP	TM171VEVM4	TM171VEVD4	TM171VEVA2	M.U.
0	dE07	49649	RW	BYTE	**Type of stepper motor control** Defines the piloting modes. • **0** = FULL STEP • **1** = HALF STEP • **2** = MICRO STEP **CAREL valves** • **3=** FULL STEP CAREL valves • **4=** HALF STEP CAREL valves • **5=** MICRO STEP CAREL valves **3...5** values are reserved to pilot CAREL valves Note that the current piloting is a maximum value for the FULL STEP mode while the other two modes, modulating the value of the winding currents, offers greater resolution and fluidity of movement but with less torque. Refer to the literature concerning step-by-step motors for more detail	0...5			0	0	0	num
0	dE08	50961	RW	BYTE	**Stepper motor enabling/disabling duty cycle** If the case of valve overheating, reduce the enabling duty cycle to allow it to cool down	0...100			100	100	100	%
0	dE09	50977	RW	BYTE	**Stepper motor acceleration/deceleration** Defines the acceleration/deceleration in motor start/stop. The time between one step and the next is reduced by **dE09** at each step until **dE01** is reached. If =0 acceleration is not applied.	0...255			50	50	50	ms*10/ step
0	dE80	50993	RW	BYTE	**Minimum stepper motor speed in acceleration/deceleration** Defines the minimum speed at which the motor starts and stops	0...255			10	10	10	steps/s

Tab. 37 Valve configuration parameters dE01...dE09, dE80 con dE00 = 0

10.2.4 - Valve configuration parameter table dE01...dE09, dE80 con dE00 ≠ 0

dE00	VALVE	LABEL	PAR. ADDR	R/W	DATA SIZE	DESCRIPTION	RANGE	CPL	EXP	TM171VEVM4	TM171VEVD4	TM171VEVA2	M.U.
1	DANFOSS ETS50	dE01	16722	RW	WORD	Stepper motor maximum speed	0...9999			160	160	160	steps/s
1	DANFOSS ETS50	dE02	16754	RW	WORD	Stepper motor complete opening	0...9999			2625	2625	2625	steps
1	DANFOSS ETS50	dE03	49553	RW	BYTE	Stepper motor extra movement in total closure	0...255			160	160	160	steps
1	DANFOSS ETS50	dE04	16802	RW	WORD	Stepper motor winding maximum current	-1999...9999			100	100	100	mA
1	DANFOSS ETS50	dE05	49601	RW	BYTE	Stepper motor winding resistance	0...255			52	52	52	ohm
1	DANFOSS ETS50	dE06	16850	RW	WORD	Stepper motor winding rated current	0...9999			75	75	75	mA
1	DANFOSS ETS50	dE07	49649	RW	BYTE	Type of stepper motor control	0...5			0	0	0	num
1	DANFOSS ETS50	dE08	50961	RW	BYTE	Stepper motor enabling/ disabling duty cycle	0...100			100	100	100	%
1	DANFOSS ETS50	dE09	50977	RW	BYTE	Stepper motor acceleration/ deceleration	0...255			50	50	50	ms*10/ step
1	DANFOSS ETS50	dE80	50993	RW	BYTE	Minimum stepper motor speed in acceleration/deceleration	0...255			15	15	15	steps/s
2	DANFOSS ETS100	dE01	16724	RW	WORD	Stepper motor maximum speed	0...9999			300	300	300	steps/s
2	DANFOSS ETS100	dE02	16756	RW	WORD	Stepper motor complete opening	0...9999			3530	3530	3530	steps
2	DANFOSS ETS100	dE03	49554	RW	WORD	Stepper motor extra movement in total closure	0...255			160	160	160	steps
2	DANFOSS ETS100	dE04	16804	RW	WORD	Maximum current stepper motor winding	-1999...9999			100	100	100	mA
2	DANFOSS ETS100	dE05	49602	RW	BYTE	Stepper motor winding resistance	0...255			52	52	52	ohm
2	DANFOSS ETS100	dE06	16852	RW	WORD	Idle current stepper motor winding	0...9999			75	75	75	mA
2	DANFOSS ETS100	dE07	49650	RW	BYTE	Type of stepper motor control	0...5			0	0	0	num
2	DANFOSS ETS100	dE08	50962	RW	BYTE	Stepper motor enabling/ disabling duty cycle	0...100			100	100	100	%
2	DANFOSS ETS100	dE09	50978	RW	BYTE	Stepper motor acceleration/ deceleration	0...255			50	50	50	ms*10/ step
2	DANFOSS ETS100	dE80	50994	RW	BYTE	Minimum stepper motor speed in acceleration/deceleration	0...255			10	10	10	steps/s
3	ALCO EX4-EX5-EX6	dE01	16726	RW	WORD	Stepper motor maximum speed	0...9999			500	500	500	steps/s
3	ALCO EX4-EX5-EX6	dE02	16758	RW	WORD	Stepper motor complete opening	0...9999			750	750	750	steps
3	ALCO EX4-EX5-EX6	dE03	49555	RW	BYTE	Stepper motor extra movement in total closure	0...255			100	100	100	steps
3	ALCO EX4-EX5-EX6	dE04	16806	RW	WORD	Maximum current stepper motor winding	-1999...9999			500	500	500	mA
3	ALCO EX4-EX5-EX6	dE05	49603	RW	BYTE	Stepper motor winding resistance	0...255			13	13	13	ohm
3	ALCO EX4-EX5-EX6	dE06	16854	RW	WORD	Idle current stepper motor winding	0...9999			100	100	100	mA
3	ALCO EX4-EX5-EX6	dE07	49651	RW	BYTE	Type of stepper motor control	0...5			0	0	0	num

dE00	VALVE	LABEL	PAR. ADDR	R/W	DATA SIZE	DESCRIPTION	RANGE	CPL	EXP	TM171VEVM4	TM171VEVD4	TM171VEVA2	M.U.
3	ALCO EX4-EX5-EX6	dE08	50963	RW	BYTE	Stepper motor enabling/ disabling duty cycle	0...100			100	100	100	%
3	ALCO EX4-EX5-EX6	dE09	50979	RW	BYTE	Stepper motor acceleration/ deceleration	0...255			50	50	50	ms*10/ step
3	ALCO EX4-EX5-EX6	dE80	50995	RW	BYTE	Minimum stepper motor speed in acceleration/deceleration	0...255			10	10	10	steps/s
4	VALUE NOT USED	-	-	-	-	-	-	-	-	-	-	-	-
5	ALCO EX7	dE01	16730	RW	WORD	Stepper motor maximum speed	0...9999			210	210	210	steps/s
5	ALCO EX7	dE02	16762	RW	WORD	Stepper motor complete opening	0...9999			1600	1600	1600	steps
5	ALCO EX7	dE03	49557	RW	BYTE	Stepper motor extra movement in total closure	0...255			100	100	100	steps
5	ALCO EX7	dE04	16810	RW	WORD	Maximum current stepper motor winding	-1999...9999			750	750	750	mA
5	ALCO EX7	dE05	49605	RW	BYTE	Stepper motor winding resistance	0...255			8	8	8	ohm
5	ALCO EX7	dE06	16858	RW	WORD	Idle current stepper motor winding	0...9999			250	250	250	mA
5	ALCO EX7	dE07	49653	RW	BYTE	Type of stepper motor control	0...5			0	0	0	num
5	ALCO EX7	dE08	50965	RW	BYTE	Stepper motor enabling/ disabling duty cycle	0...100			100	100	100	%
5	ALCO EX7	dE09	50981	RW	BYTE	Stepper motor acceleration/ deceleration	0...255			50	50	50	ms*10/ step
5	ALCO EX7	dE80	50997	RW	BYTE	Minimum stepper motor speed in acceleration/deceleration	0...255			10	10	10	steps/s
6	ALCO EX8	dE01	16732	RW	WORD	Stepper motor maximum speed	0...9999			500	500	500	steps/s
6	ALCO EX8	dE02	16764	RW	WORD	Stepper motor complete opening	0...9999			2600	2600	2600	steps
6	ALCO EX8	dE03	49558	RW	BYTE	Stepper motor extra movement in total closure	0...255			100	100	100	steps
6	ALCO EX8	dE04	16812	RW	WORD	Maximum current stepper motor winding	-1999...9999			800	800	800	mA
6	ALCO EX8	dE05	49606	RW	BYTE	Stepper motor winding resistance	0...255			6	6	6	ohm
6	ALCO EX8	dE06	16860	RW	WORD	Idle current stepper motor winding	0...9999			500	500	500	mA
6	ALCO EX8	dE07	49654	RW	BYTE	Type of stepper motor control	0...5			0	0	0	num
6	ALCO EX8	dE08	50966	RW	BYTE	Stepper motor enabling/ disabling duty cycle	0...100			100	100	100	%
6	ALCO EX8	dE09	50982	RW	BYTE	Stepper motor acceleration/ deceleration	0...255			50	50	50	ms*10/ step
6	ALCO EX8	dE80	50998	RW	BYTE	Minimum stepper motor speed in acceleration/deceleration	0...255			10	10	10	steps/s
7	CAREL E2V-E3V-E4V E5V-E6V-E7V	dE01	16734	RW	WORD	Stepper motor maximum speed	0...9999			45	45	45	steps/s
7	CAREL E2V-E3V-E4V E5V-E6V-E7V	dE02	16766	RW	WORD	Stepper motor complete opening	0...9999			480	480	480	steps

dE00	VALVE	LABEL	PAR. ADDR	R/W	DATA SIZE	DESCRIPTION	RANGE	CPL	EXP	TM171VEVM4	TM171VEVD4	TM171VEVA2	M.U.
7	CAREL E2V-E3V-E4V E5V-E6V-E7V	dE03	49559	RW	BYTE	Stepper motor extra movement in total closure	0...255			70	70	70	steps
7	CAREL E2V-E3V-E4V E5V-E6V-E7V	dE04	16814	RW	WORD	Maximum current stepper motor winding	-1999...9999			450	450	450	mA
7	CAREL E2V-E3V-E4V E5V-E6V-E7V	dE05	49607	RW	BYTE	Stepper motor winding resistance	0...255			36	36	36	ohm
7	CAREL E2V-E3V-E4V E5V-E6V-E7V	dE06	16862	RW	WORD	Stepper motor winding rated current	0...9999			100	100	100	mA
7	CAREL E2V-E3V-E4V E5V-E6V-E7V	dE07	49655	RW	BYTE	Type of stepper motor control	0...5			5	5	5	num
7	CAREL E2V-E3V-E4V E5V-E6V-E7V	dE08	50967	RW	BYTE	Stepper motor enabling/ disabling duty cycle	0...100			30	30	30	%
7	CAREL E2V-E3V-E4V E5V-E6V-E7V	dE09	50983	RW	BYTE	Stepper motor acceleration/ deceleration	0...255			250	250	250	ms*10/ step
7	CAREL E2V-E3V-E4V E5V-E6V-E7V	dE80	50999	RW	BYTE	Minimum stepper motor speed in acceleration/deceleration	0...255			10	10	10	steps/s
8	SPORLAN SER	dE01	16736	RW	WORD	Stepper motor maximum speed	0...9999			200	200	200	steps/s
8	SPORLAN SER	dE02	16768	RW	WORD	Stepper motor complete opening	0...9999			1596	1596	1596	steps
8	SPORLAN SER	dE03	49560	RW	BYTE	Stepper motor extra movement in total closure	0...255			100	100	100	steps
8	SPORLAN SER	dE04	16816	RW	WORD	Maximum current stepper motor winding	-1999...9999			120	120	120	mA
8	SPORLAN SER	dE05	49608	RW	BYTE	Stepper motor winding resistance	0...255			100	100	100	ohm
8	SPORLAN SER	dE06	16864	RW	WORD	Idle current stepper motor winding	0...9999			50	50	50	mA
8	SPORLAN SER	dE07	49656	RW	BYTE	Type of stepper motor control	0...5			0	0	0	num
8	SPORLAN SER	dE08	50968	RW	BYTE	Stepper motor enabling/ disabling duty cycle	0...100			100	100	100	%
8	SPORLAN SER	dE09	50984	RW	BYTE	Stepper motor acceleration/ deceleration	0...255			50	50	50	ms*10/ step
8	SPORLAN SER	dE80	51000	RW	BYTE	Minimum stepper motor speed in acceleration/deceleration	0...255			10	10	10	steps/s
9	SPORLAN SEI-30	dE01	16738	RW	WORD	Stepper motor maximum speed	0...9999			200	200	200	steps/s
9	SPORLAN SEI-30	dE02	16770	RW	WORD	Stepper motor complete opening	0...9999			3193	3193	3193	steps
9	SPORLAN SEI-30	dE03	49561	RW	BYTE	Stepper motor extra movement in total closure	0...255			100	100	100	steps
9	SPORLAN SEI-30	dE04	16818	RW	WORD	Maximum current stepper motor winding	-1999...9999			160	160	160	mA
9	SPORLAN SEI-30	dE05	49609	RW	BYTE	Stepper motor winding resistance	0...255			75	75	75	ohm
9	SPORLAN SEI-30	dE06	16866	RW	WORD	Idle current stepper motor winding	0...9999			50	50	50	mA

dE00	VALVE	LABEL	PAR. ADDR	R/W	DATA SIZE	DESCRIPTION	RANGE	CPL	EXP	TM171VEVM4	TM171VEVD4	TM171VEVA2	M.U.
9	SPORLAN SEI-30	dE07	49657	RW	BYTE	Type of stepper motor control	0...5			0	0	0	num
9	SPORLAN SEI-30	dE08	50969	RW	BYTE	Stepper motor enabling/ disabling duty cycle	0...100			100	100	100	%
9	SPORLAN SEI-30	dE09	50985	RW	BYTE	Stepper motor acceleration/ deceleration	0...255			50	50	50	ms*10/ step
9	SPORLAN SEI-30	dE80	51001	RW	BYTE	Minimum stepper motor speed in acceleration/deceleration	0...255			10	10	10	steps/s
10	SPORLAN SEI-50 SEH*	dE01	16740	RW	WORD	Stepper motor maximum speed	0...9999			200	200	200	steps/s
10	SPORLAN SEI-50 SEH*	dE02	16772	RW	WORD	Stepper motor complete opening	0...9999			6386	6386	6386	steps
10	SPORLAN SEI-50 SEH*	dE03	49562	RW	BYTE	Stepper motor extra movement in total closure	0...255			100	100	100	steps
10	SPORLAN SEI-50 SEH*	dE04	16820	RW	WORD	Maximum current stepper motor winding	-1999...9999			160	160	160	mA
10	SPORLAN SEI-50 SEH*	dE05	49610	RW	BYTE	Stepper motor winding resistance	0...255			75	75	75	ohm
10	SPORLAN SEI-50 SEH*	dE06	16868	RW	WORD	Idle current stepper motor winding	0...9999			50	50	50	mA
10	SPORLAN SEI-50 SEH*	dE07	49658	RW	BYTE	Type of stepper motor control	0...5			0	0	0	num
10	SPORLAN SEI-50 SEH*	dE08	50970	RW	BYTE	Stepper motor enabling/ disabling duty cycle	0...100			100	100	100	%
10	SPORLAN SEI-50 SEH*	dE09	50986	RW	BYTE	Stepper motor acceleration/ deceleration	0...255			50	50	50	ms*10/ step
10	SPORLAN SEI-50 SEH*	dE80	51002	RW	BYTE	Minimum stepper motor speed in acceleration/deceleration	0...255			10	10	10	steps/s
11	VALUE NOT USED	-	-	-	-	-	-	-	-	-	-	-	-
12	SPORLAN SER(I) G, J, K, B, C, D	dE01	16744	RW	WORD	Stepper motor maximum speed	0 ... 9999			160	160	160	steps/s
12	SPORLAN SER(I) G, J, K, B, C, D	dE02	16776	RW	WORD	Stepper motor complete opening	0...9999			2500	2500	2500	steps
12	SPORLAN SER(I) G, J, K, B, C, D	dE03	49564	RW	BYTE	Stepper motor extra movement in total closure	0...255			100	100	100	steps
12	SPORLAN SER(I) G, J, K, B, C, D	dE04	16824	RW	WORD	Maximum current stepper motor winding	-1999...9999			120	120	120	mA
12	SPORLAN SER(I) G, J, K, B, C, D	dE05	49612	RW	BYTE	Stepper motor winding resistance	0...255			100	100	100	ohm
12	SPORLAN SER(I) G, J, K, B, C, D	dE06	16872	RW	WORD	Idle current stepper motor winding	0...9999			50	50	50	mA
12	SPORLAN SER(I) G, J, K, B, C, D	dE07	49660	RW	BYTE	Type of stepper motor control	0...5			0	0	0	num
12	SPORLAN SER(I) G, J, K, B, C, D	dE08	50972	RW	BYTE	Stepper motor enabling/ disabling duty cycle	0...100			100	100	100	%

dE00	VALVE	LABEL	PAR. ADDR	R/W	DATA SIZE	DESCRIPTION	RANGE	CPL	EXP	TM171VEVM4	TM171VEVD4	TM171VEVA2	M.U.
12	SPORLAN SER(I) G, J, K, B, C, D	dE09	50988	RW	BYTE	Stepper motor acceleration/ deceleration	0...255			255	255	255	ms*10/ step
12	SPORLAN SER(I) G, J, K, B, C, D	dE80	51004	RW	BYTE	Minimum stepper motor speed in acceleration/deceleration	0...255			12	12	12	steps/s
13	ALCO EXM246 - EXL246	dE01	16746	RW	WORD	Stepper motor maximum speed	0...9999			45	45	45	steps/s
13	ALCO EXM246 - EXL246	dE02	16778	RW	WORD	Stepper motor complete opening	0...9999			250	250	250	steps
13	ALCO EXM246 - EXL246	dE03	49565	RW	BYTE	Stepper motor extra movement in total closure	0...255			100	100	100	steps
13	ALCO EXM246 - EXL246	dE04	16826	RW	WORD	Stepper motor winding maximum current	-1999...9999			65	65	65	mA
13	ALCO EXM246 - EXL246	dE05	49613	RW	BYTE	Stepper motor winding resistance	0...255			250	250	250	ohm
13	ALCO EXM246 - EXL246	dE06	16874	RW	WORD	Stepper motor winding rated current	0...9999			65	65	65	mA
13	ALCO EXM246 - EXL246	dE07	49661	RW	BYTE	Type of stepper motor control	0...5			1	1	1	num
13	ALCO EXM246 - EXL246	dE08	50973	RW	BYTE	Stepper motor enabling/ disabling duty cycle	0...100			100	100	100	%
13	ALCO EXM246 - EXL246	dE09	50989	RW	BYTE	Stepper motor acceleration/ deceleration	0...255			50	50	50	ms*10/ step
13	ALCO EXM246 - EXL246	dE80	51005	RW	BYTE	Minimum stepper motor speed in acceleration/deceleration	0...255			10	10	10	steps/s
14	SANHUA DPF(Q) - DPF(T01)	dE01	16750	RW	WORD	Stepper motor maximum speed	0...9999			40	40	40	steps/s
14	SANHUA DPF(Q) - DPF(T01)	dE02	16782	RW	WORD	Stepper motor complete opening	0...9999			250	250	250	steps
14	SANHUA DPF(Q) - DPF(T01)	dE03	49567	RW	BYTE	Stepper motor extra movement in total closure	0...255			50	50	50	steps
14	SANHUA DPF(Q) - DPF(T01)	dE04	16830	RW	WORD	Stepper motor winding maximum current	-1999...9999			105	105	105	mA
14	SANHUA DPF(Q) - DPF(T01)	dE05	49615	RW	BYTE	Stepper motor winding resistance	0...255			92	92	92	ohm
14	SANHUA DPF(Q) - DPF(T01)	dE06	16878	RW	WORD	Stepper motor winding rated current	0...9999			35	35	35	mA
14	SANHUA DPF(Q) - DPF(T01)	dE07	49663	RW	BYTE	Type of stepper motor control	0...5			1	1	1	num

dE00	VALVE	LABEL	PAR. ADDR	R/W	DATA SIZE	DESCRIPTION	RANGE	CPL	EXP	TM171VEVM4	TM171VEVD4	TM171VEVA2	M.U.
14	SANHUA DPF(Q) - DPF(T01)	dE08	50975	RW	BYTE	Stepper motor enabling/ disabling duty cycle	0...100			100	100	100	%
14	SANHUA DPF(Q) - DPF(T01)	dE09	50991	RW	BYTE	Stepper motor acceleration/ deceleration	0...255			50	50	50	ms*10/ step
14	SANHUA DPF(Q) - DPF(T01)	dE80	51007	RW	BYTE	Minimum stepper motor speed in acceleration/deceleration	0...255			10	10	10	steps/s
15	ELIWELL SXVB by CASTEL	dE01	16750	RW	WORD	Stepper motor maximum speed	0...9999			20	20	20	steps/s
15	ELIWELL SXVB by CASTEL	dE02	16782	RW	WORD	Stepper motor complete opening	0...9999			195	195	195	steps
15	ELIWELL SXVB by CASTEL	dE03	49567	RW	BYTE	Stepper motor extra movement in total closure	0...255			60	60	60	steps
15	ELIWELL SXVB by CASTEL	dE04	16830	RW	WORD	Maximum current stepper motor winding	-1999...9999			-200	-200	-200	mA
15	ELIWELL SXVB by CASTEL	dE05	49615	RW	BYTE	Stepper motor winding resistance	0...255			54	54	54	ohm
15	ELIWELL SXVB by CASTEL	dE06	16878	RW	WORD	Idle current stepper motor winding	0...9999			50	50	50	mA
15	ELIWELL SXVB by CASTEL	dE07	49663	RW	BYTE	Type of stepper motor control	0...5			0	0	0	num
15	ELIWELL SXVB by CASTEL	dE08	50975	RW	BYTE	Stepper motor enabling/ disabling duty cycle	0...100			100	100	100	%
15	ELIWELL SXVB by CASTEL	dE09	50991	RW	BYTE	Stepper motor acceleration/ deceleration	0...255			50	50	50	ms*10/ step
15	ELIWELL SXVB by CASTEL	dE80	51007	RW	BYTE	Minimum stepper motor speed in acceleration/deceleration	0...255			10	10	10	steps/s

Tab. 38 Valve configuration parameters dE01...dE09, dE80 con dE ≠0

10.2.5 - Folder visibility table

LABEL	PAR. ADDR	R/W	DESCRIPTION	DATA SIZE	RANGE	CPL	EXP	TM171VEVM4	TM171VEVD4	TM171VEVA2	M.U.
rE	49424	RW	Folder Visibility	2 bit	0...3			3	3	0	num
Ai	49424.2	RW	Folder Visibility	2 bit	0...3			3	3	0	num
di	49424.4	RW	Folder Visibility	2 bit	0...3			3	3	0	num
dO	49424.6	RW	Folder Visibility	2 bit	0...3			3	3	0	num
SP	49425	RW	Folder Visibility	2 bit	0...3			3	3	0	num
PAr	49425.2	RW	Folder Visibility	2 bit	0...3			3	3	0	num
FnC	49425.4	RW	Folder Visibility	2 bit	0...3			3	3	0	num
PASS	49425.6	RW	Folder Visibility	2 bit	0...3			3	3	0	num
SP1	49426.2	RW	Folder Visibility	2 bit	0...3			3	3	0	num
SP2	49426.4	RW	Folder Visibility	2 bit	0...3			3	3	0	num
SP3	49426.6	RW	Folder Visibility	2 bit	0...3			3	3	0	num
SP4	49427	RW	Folder Visibility	2 bit	0...3			3	3	0	num
dF	49427.4	RW	Folder Visibility	2 bit	0...3			3	3	3	num
dF43	49449	RW	Folder Visibility	2 bit	0...3			3	3	3	num
dF44	49449.2	RW	Folder Visibility	2 bit	0...3			3	3	3	num
dL	49427.2	RW	Folder Visibility	2 bit	0...3			3	3	3	num
dE	49427.6	RW	Folder Visibility	2 bit	0...3			3	3	3	num
UI	49428	RW	Folder Visibility	2 bit	0...3			3	3	3	num
CC	49428.2	RW	Folder Visibility	2 bit	0...3			3	3	3	num
UL	49459.2	RW	Folder Visibility	2 bit	0...3			3	3	3	num
DL	49459.4	RW	Folder Visibility	2 bit	0...3			3	3	3	num
FR	49459.6	RW	Folder Visibility	2 bit	0...3			3	3	3	num

Tab. 39 Display folder (Folder)

10.2.6 - Client Table

INDEX	FOLDER	LABEL	PAR. ADDR	R/W	DESCRIPTION	DATA SIZE	RANGE	CPL	EXP	M.U.
1	Ai	dAi1	563	R	Analog Input 1 (view)	WORD	-500...9999	Y	-1	°C/°F/ bar/PSI
2	Ai	dAi2	565	R	Analog Input 2 (view)	WORD	-500...9999	Y	-1	°C/°F/ bar/PSI
5	Ai	dAi3	567	R	Analog Input 3 (view)	WORD	-500...9999	Y	-1	°C/°F
6	Ai	dAi4	569	R	Analog Input 4 (view)	WORD	-500...9999	Y	-1	°C/°F
7	Ai	drE1	432	R	valve overheating temperature EEVD	WORD	-500...9999	Y	-1	°C/°F
8	Ai	drE2	434	R	Valve saturation temperature EEVD	WORD	-500...9999	Y	-1	°C/°F
9	Ai	drE3	436	R	Valve overheating temperature EEVD (backup)	WORD	-500...9999	Y	-1	°C/°F
10	Ai	drE4	438	R	Valve saturation temperature EEVD (backup)	WORD	-500...9999	Y	-1	°C/°F
11	Ai	drE5	446	R	Valve overheating EEVD	WORD	-500...9999	Y	-1	K/°R
12	Ai	drE6	448	R	valve evaporator pressure EEVD	WORD	-500...9999	Y	-1	bar/PSI
13	Ai	drE7	450	R	valve opening percentage EEVD	WORD	-500...9999		-1	%
14	Ai	SP4	519	R	valve overheating setpoint EEVD	WORD	-500...9999	Y	-1	K/°R
29	Ai	evaporatorPress	525	RW	valve evaporator pressure from remote (shared probe)	WORD	-500...9999	Y	-1	PSI
30	Ai	evaporatorTemp	527	RW	valve saturation temperature from remote (shared probe)	WORD	-500...9999	Y	-1	°F
31	Di	ddi1	33062	R	Digital input 1	1 bit	0...1			flag
32	Di	ddi2	33062.1	R	Digital input 2	1 bit	0...1			flag
33	Di	Dip1	33058.1	R	DIP switch 1 status	1 bit	0...1			flag
34	Di	Dip2	33058.2	R	DIP switch 2 status	1 bit	0...1			flag
35	Di	Dip3	33058.3	R	DIP switch 3 status	1 bit	0...1			flag
36	Di	Dip4	33058.4	R	DIP switch 4 status	1 bit	0...1			flag
37	Di	Dip5	33058.5	R	DIP switch 5 status	1 bit	0...1			flag
38	Di	Dip6	33058.6	R	DIP switch 6 status	1 bit	0...1			flag
39	dO	ddO1	33063.6	R	Digital output ddO1	1 bit	0...1			flag
40	dO	ddO2	33063.5	R	Digital output ddO2	1 bit	0...1			flag
41	Alarm	Er01	33052.1	R	Probe error dAi1	1 bit	0...1			flag
42	Alarm	Er02	33052.2	R	Probe error dAi2	1 bit	0...1			flag
43	Alarm	Er03	33052.3	R	Probe error dAi3	1 bit	0...1			flag
44	Alarm	Er04	33052.4	R	Probe error dAi4	1 bit	0...1			flag
45	Alarm	Er05	33052.5	R	Valve overheating probe alarm EEVD	1 bit	0...1			flag
46	Alarm	Er06	33052.6	R	Valve saturation probe alarm EEVD	1 bit	0...1			flag
47	Alarm	Er07	33052.7	R	Valve MOP alarm EEVD	1 bit	0...1			flag

INDEX	FOLDER	LABEL	PAR. ADDR	R/W	DESCRIPTION	DATA SIZE	RANGE	CPL	EXP	M.U.
48	Alarm	Er08	33053	R	Valve output max alarm EEVD	1 bit	0...1			flag
49	Alarm	Er09	33053.1	R	Valve external alarm EEVD	1 bit	0...1			flag
50	Alarm	Er10	33053.2	R	Valve no-link alarm EEVD	1 bit	0...1			flag
51	Alarm	Er11	33053.3	R	Valve motor alarm EEVD: high current absorption	1 bit	0...1			flag
52	Alarm	Er12	33053.4	R	Valve motor alarm EEVD: winder 1 not connected	1 bit	0...1			flag
53	Alarm	Er13	33053.5	R	Valve motor alarm EEVD: winder 1 in short circuit	1 bit	0...1			flag
54	Alarm	Er14	33053.6	R	Valve motor alarm EEVD: winder 2 not connected	1 bit	0...1			flag
55	Alarm	Er15	33053.7	R	Valve motor alarm EEVD: winder 2 in short circuit	1 bit	0...1			flag
56	State	EEV_STTS_ON	33257	R	Enable EEVD valve control	1 bit	0...1			flag
57	State	EEV_STTS_ALM	33257.1	R	EEVD alarm	1 bit	0...1			flag
58	State	EEV_STTS_DEFR	33257.2	R	EEVD defrost	1 bit	0...1			flag
59	State	EEV_STTS_NOLINK	33257.3	R	control status in no-link	1 bit	0...1			flag
60	State	EEV_STTS_MOD	33257.4	R	Select function modes	2 bit	0...3			num
61	State	EEV_STTS_SPECIAL_ON	33257.6	R	Opening state of fixed valve before EEVD closure	1 bit	0...1			num
62	State	EEV_STTS_FORCE_OPEN	33257.7	R	Forced complete EEVC valve opening state	1 bit	0...1			num
63	Net Command	EEV_STTS_ON_SET	33259	W	Valve control ON	1 bit	0...1			flag
64	Net Command	EEV_STTS_ALM_SET	33259.1	W	Alarm status ON	1 bit	0...1			flag
65	Net Command	EEV_STTS_DEFR_SET	33259.2	W	Defrost status ON	1 bit	0...1			flag
66	Net Command	EEV_STTS_SPECIAL_ON_SET	33259.6	W	Valve opening command FIX ON	1 bit	0...1			flag
67	Net Command	EEV_STTS_FORCE_OPEN_SET	33259.7	W	Valve opening command 100% ON	1 bit	0...1			flag
68	Net Command	EEV_STTS_MOD_SET	33259.4	W	Selection command operating mode 0: 00 → command 1 1: 01 → command 2 2: 10 → command 3 3: 11 → command 4	2 bit	0...3			num
72	Net Command	EEV_STTS_ON_RESET	33259	W	Valve control OFF	1 bit	0...1			flag
73	Net Command	EEV_STTS_ALM_RESET	33259.1	W	Alarm status OFF	1 bit	0...1			flag
74	Net Command	EEV_STTS_DEFR_RESET	33259.2	W	Defrost status OFF	1 bit	0...1			flag
75	Net Command	EEV_STTS_SPECIAL_ON_ RESET	33259.6	W	Valve opening command FIX OFF	1 bit	0...1			flag
76	Net Command	EEV_STTS_FORCE_OPEN_ RESET	33259.7	W	Valve opening command 100% OFF	1 bit	0...1			flag

Tab. 40 Client

11 - ALARMS

TM171VEV•• can run full diagnostics on the installation, signalling any operating errors with specific alarms found, and record and signal any user-defined unusual events to have greater control over the installation as a whole.

The alarm condition is always reported by the LED near the alarm icon and the enabling of the output on the relay, if appropriately configured.

The probe error is shown directly on the **TM171DLED** terminal display. Refer to **"11.1 - Alarms table" on page 81**.

11.1 - Alarms table

Label	Description/Cause (default settings)	Effect	Reset	Solution
Er01	**dAi1 probe error** • Measured values are outside the nominal range. • Control probe inoperable/short-circuited/ open.	• Only reported if the relative backup probe dAi2 is configured • Otherwise see Er06.	A	• Check the probe wiring. • Replace probe. • When error has been removed, regulation continues as normal.
Er02	**dAi2 probe error** Same as Er01.	Same as Er01 (probe dAi1).	A	Same as Er01.
Er03	**dAi3 probe error** Same as Er01.	• Only reported if the relative backup probe Ai4 is configured. • Otherwise see Er05.	A	Same as Er01.
Er04	**dAi4 probe error** Same as Er01.	Same as Er01 (probe dAi3).	A	Same as Er01.
Er05	**Evaporator output probe error.** Both probes Ai3 Ai4 are inoperable.	% valve opening =dE16.	A	Same as Er01.
Er06	**Saturation output error.** Both probes Ai1, Ai2 are inoperable.	• Example dE50 = 0 % valve opening = dE16. • Example dE50 = 1 Valve closed.	A	Same as Er01.
Er07	**MOP alarm.** Saturation temperature > MOP setpoint (dE52) for longer than dE53.	Only if dE50 = 1. Valve closed.	A	Wait for saturation temperature to return < dE52.
Er08	% maximum valve opening drE7 ≥ dE10 for longer than dE13.	Report only.	A	Wait for return % of maximum valve opening drE7 < dE10.
Er09	**External alarm.** Activation of digital input configured as external alarm. See parameters dL40/dL41=±3.	Valve closed.	A	Deactivation of digital input configured as external alarm.
Er10	**NO link alarm.** Serial communication unsuccessful (dF02 = 1, 2)	Valve closed.	A	Restore communication.
Er11	**Motor protection alarm.** Excessive current absorption.	Valve closed.	A	• Check motor phases. • Check motor connection.
Er12	**Motor protection alarm.** Winder 1 disconnected.	Valve closed.	A	• Check winder 1 connection (terminals 6-7). • Check correct parameter settings dE01...dE09, dE80.
Er13	**Motor protection alarm.** Winder 1 short circuit.	Valve closed.	A	Same as Er12.
Er14	**Motor protection alarm.** Winder 2 disconnected.	Valve closed.	A	• Check winder 2 connection (terminals 4-5). • Check correct parameter settings dE01...dE09, dE80.
Er15	**Motor protection alarm.** Winder 2 short circuit.	Valve closed.	A	Same as Er14.

Tab. 41 Alarms

12 - TM171AMFK (FnC FOLDER)

12.1 - Introduction

When connected to the Energy TTL serial port, the **TM171AMFK** (MFK) allows you to rapidly program device parameters (up/download parameter map to or from one or more devices of the same type) and/or the device application.

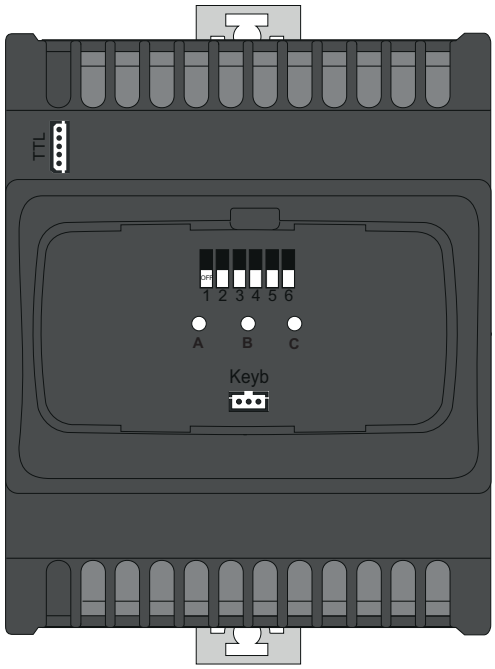


Fig. 19 Connecting the Multi Function Key

To connect the MFK to the TTL serial port, use the yellow cable supplied.

The upload (label UL), download (label dL) and copy card formatting (label Fr) operations are performed as explained below:

UPLOAD: copy from CONTROLLER to **TM171AMFK** (MFK)
By doing this, the programming parameters and/or application will be uploaded from FREE to the MFK.

DOWNLOAD: copy from **TM171AMFK** (MFK) to CONTROLLER
By doing this, the programming parameters will be downloaded from the MFK to the device.

FORMAT*: Formatting the **TM171AMFK** consists of deleting its contents.

*This should be done prior to Uploading when used for the first time.

There are two ways of using the **TM171AMFK**.

- Using the DIP switches (only Upload/Download)
- Via the **TM171DLED** terminal

12.2 - Upload/Download via DIP switch

Proceed as follows:

1. insert the **TM171AMFK** (MFK) in the connector with the device switched on;
2. place the DIP switches 1 or 2 inside the door to “ON”, as described in the following table;
3. when the operation has been completed, remove the **TM171AMFK** (MFK);
4. return the DIP switch to OFF.

		Dip1	2	3	4	5	6
Upload/Download parameters from MFK (**TM171AMFK**)	Upload	ON	OFF	-	-	-	-
	Download	OFF	ON	-	-	-	-

Tab. 42 Upload/Download via DIP switch

12.2.1 - DIP switch led

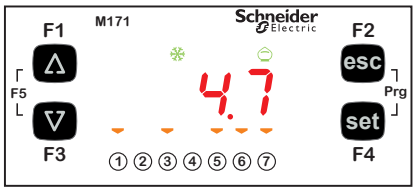
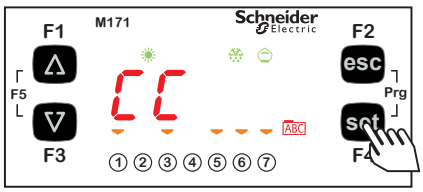
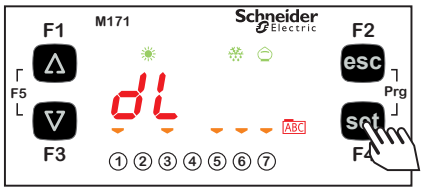
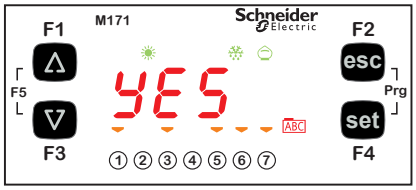
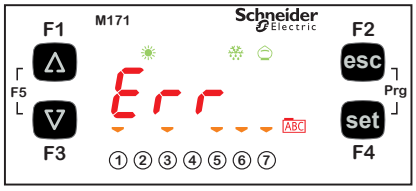
The leds A/B/C inside the door indicate the operating state.

LED	Colour	Upload		
		Underway	Terminated correctly	Terminated incorrectly
A	Green	Flashing	ON	ON
B	Yellow	-	-	-
C	Green	-	-	Flashing
LED	**Colour**	**Download**		
		Underway	**Terminated correctly**	**Terminated incorrectly**
A	Green	-	-	-
B	Yellow	Flashing	ON	ON
C	Green	-	-	Flashing

Tab. 43 DIP switch led

12.3 - Upload/Download via TM171DLED

A step by step illustration of how to proceed is provided below.

Upload/Download/Format	
	From the main display press “esc” and “set” at the same time. The label ‘PAr’ will appear. Use “UP” and “DOWN” to view the label “FnC”. Press “set”. The CC label will appear.
	The commands you need to use the Multi Function Key are in the CC folder. Press “set” to access the functions.
	Scroll “UP” and “DOWN” to look for the function you want: • UL for upload • dL for download • Fr for format Press “set” to upload or download (in the example dL- download). Wait for a few seconds.
	If the operation is successful, the display shows “YES”.
	If the command is NOT successful, the display shows “Err”.

12.3.1 - Download from TM171AMFK

Connect the key with the device switched off.

Firmware download

At start up, if a compatible firmware is loaded into the **TM171AMFK** (MFK), the new firmware is downloaded into the device.

This happens as follows:

- firmware verification/update (**TM171AMFK** led flashes);
- termination with successful programming (**TM171AMFK** led on steady);
- device switch off.

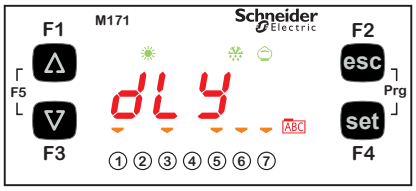
If a compatible firmware is not loaded into the **TM171AMFK**, no download takes place.

If, on termination, the **TM171AMFK** led does not stay on steady, the operation must be repeated as this means it was terminated incorrectly.

Download parameters

On start up, if there is a compatible parameter map in the **TM171AMFK**, the programming parameters are loaded into the device.

Download from reset

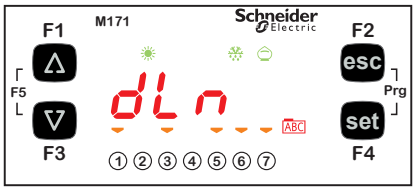


Example A

lamp test completed …

...dLY… appears on the display

If the procedure was completed successfully.

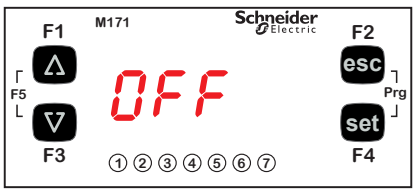


Example B

lamp test completed …

…dLn... appears on the display

If the procedure was not completed successfully °.



In both cases, the instrument will be switched OFF locally (OFF appears on the display).

When you press “DOWN” (°°), the controller will operate:

- With the new map Example A;
- With the previous map Example B.

Remove the Copy Card on completion.

- If the **TM171AMFK** is loaded with both a compatible firmware and a compatible parameter map, the firmware is downloaded first and then (after the device has been switched off and back on again manually) the parameter map.
- The formatting function is ONLY REQUIRED FOR UPLOADING **.
  - to use the **TM171AMFK** the first time (MFK that has never been used);
  - to use the **TM171AMFK** with references that are not compatible.

** a pre-programmed card supplied by Eliwell to DOWNLOAD parameters does not need to be formatted.

Formatting can **NOT** be cancelled.

- After the download operation, the instrument will work with the newly loaded parameters map/firmware.
- Remove the key on completion of the operation.

° If the string Err / dLn (download from reset) appears:

- check that the key is connected to the device;
- check the **TM171AMFK** – **TM171VEV••** connection (check the TTL cable);
- check that the key is compatible with the device;
- contact the Schneider Electric Technical Support.

°° Refer to **“6 - USER INTERFACE” on page 36**.

13 - SUPERVISION

The serial TTL - also called COM0 – can be used to configure the device, parameters, states, and variables with Modbus via the Modbus protocol.

13.1 - Configuration with Modbus RTU

Modbus is a client/server protocol for communication between devices connected in a network.

Modbus devices communicate using a master-slave technique in which only one device (master) can send messages.
The other devices in the network (slave) respond, returning the data requested by the master or executing the action contained in the message sent. A slave is a device connected to a network that processes information and sends the results to the master using the Modbus protocol.

The master device can send messages to individual slaves or to the entire network (broadcast) whilst slaves can only respond individually to the master.

The Modbus standard used by Schneider Electric employs the RTU code for data transmission.

13.2 - Data format (RTU)

The coding model used defines the structure of messages transmitted on the network and the way in which this information is deciphered. The coding type is usually chosen according to specific parameters (baud rate, parity, etc.)*. Some devices also support only certain coding models. However this must be the same for all devices connected to a modbus network.

The protocol uses the RTU binary method with bytes configured as follows:
- 8 bit for data, even parity bit (not configurable), 1 stop bit.

* Can be set via parameters **dF30**, **dF31**.

Parameter setting allows the full configuration of the device.

The parameters can be modified via:
- **TM171DLED** terminal;
- **TM171AMFK** (MFK);

sending data via Modbus protocol directly to an individual controller or broadcasting it using the address 0.

Refer to **(Fig. 20)** and **(Fig. 21)** for the connection diagram for use with modbus.

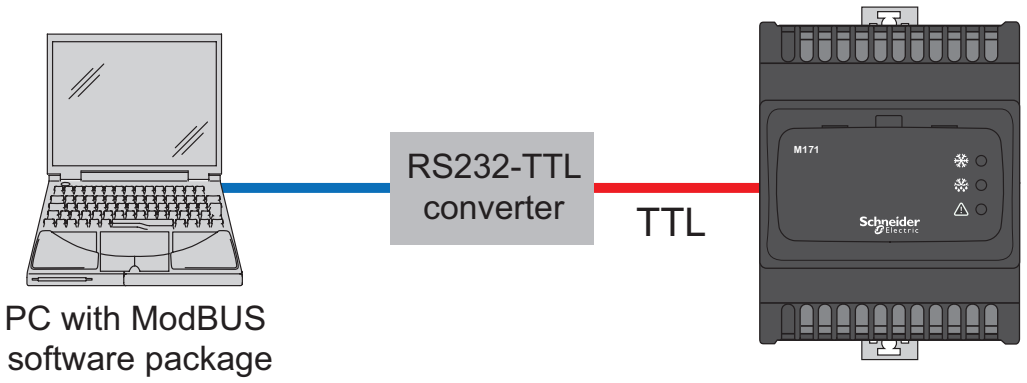


Fig. 20 ModBus connection to individual devices via TTL

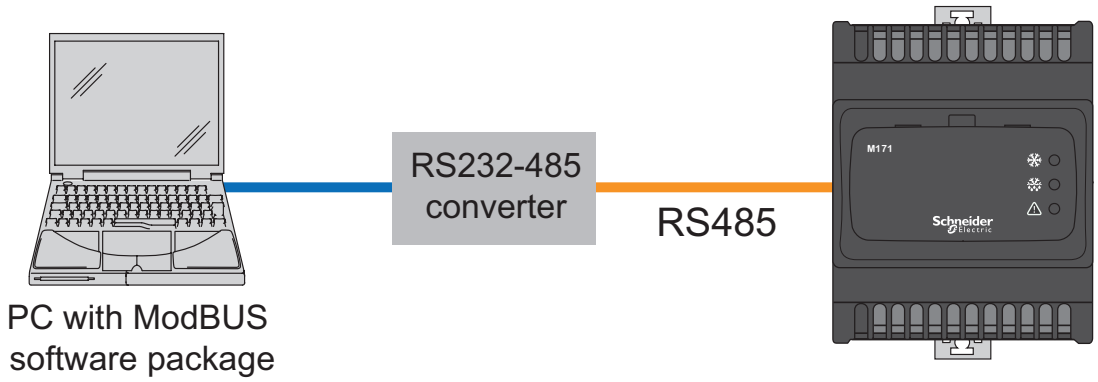


Fig. 21 ModBus connection to multiple devices via RS485

PC connection / Interface	RS232 cable
Device / TTL Interface connection	5-wire TTL cable (30cm) in length (other measurements/lengths available)
Device / RS485 Interface connection	RS485 cabled, screened and twisted (e.g.: Belden cable reference 8762)

Tab. 44 Connection for use with modbus

Modbus commands available and data areas

Modbus command	Description of command	
3	Read multiple registers on Client side	
16	Write multiple registers on Client side	
43	0	Manufacturer ID
	1	Reference ID
	2	Instrument ID

Tab. 45 Modbus commands available and data areas

Maximum length in bytes of messages sent to device	60 BYTES
Maximum length in bytes of messages received from the device	60 BYTES

Tab. 46 Length restrictions

13.3 - Configuration of device address

The address of a device (Device Number) in a ModBus message is defined in parameter dF30.
Refer to **“10 - PARAMETERS (PAr)” on page 59**.

The address 0 is used for broadcast messages that all slaves recognize. Slaves don’t respond to broadcast messages.

13.4 - Configuration of parameter addresses

For the list of addresses, refer to **“10.2.1 - Parameter table / visibility” on page 63**.

13.5 - Configuration of variable addresses / states

For the list of addresses, refer to **“10.2.6 - Client Table” on page 79.**